BREAK-IN

March/April 2012

The Official Journal of the
New Zealand Association of Radio Transmitters (Inc.)

Dedicated to

Amateur Radio and Electronics

in New Zealand since 1928

NZART Conference 2012 in Hamtastic Nelson

In this issue:

- Working with coaxial transmission lines and connectors; Part 1
- Kiwi Spotter
- Training and testing issues
- Book review; The Birth of British Radar
- NZART Conference 2012; information and registration
- NZART VHF-SHF Records; rules and guideline changes
- Arrival of TV in Hastings and Napier

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BREAK-IN

Volume **85**
Number **2**
MARCH/APRIL 2012

*The term **break-in** refers to a system in CW whereby the transmitting station can hear the other station's signal during "key up" periods.*

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PAST ISSUES OF *BREAK-IN*
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From The Editor

John Walker ZL3IB
<editor@nzart.org.nz>

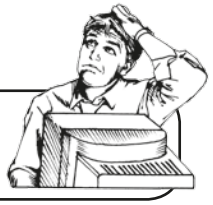
Apart from the past year's earthquakes *Break-In* has just undergone a bit of an upheaval regarding its printing and production. Recently our very able typesetter Vanessa Tansey resigned from Wyatt & Wilson and I should like to pay tribute to her excellent work for *Break-In*. The work of the typesetter is key factor in the final appearance of the magazine. Further events have led us to transfer *Break-In* production and printing to PWAGriffin.

The January/February issue of *Break-In* was embarrassingly 'skinny' due to lack of copy; I can't print what I haven't got! Surely there must be short but interesting news items about recent branch activities, equipment reviews, letters to editor, etc which all would be grist for the *Break-In* mill ? However I am pleased that this issue is rather healthier.

As usual the March/April issue includes NZART Annual Reports etc plus Conference information and registration details. The last Conference held in Nelson was a great success and I am sure that the coming event will be even better. Sheila and I are certainly looking forward to being there.

See you in Nelson.

John Walker ZL31B,
Editor



Next deadline for copy is
10 May 2012

Contributions to Break-In

Break-In is a forum for NZART member's amateur radio projects, experiences, opinions and news. Your contributions and feedback is welcomed. Contact the Editor John Walker ZL3IB at <john.zl3ib@ihug.co.nz>

New Zealand Association of Radio Transmitters INC

(Founder Member of the International Amateur Radio Union Region 3)

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From The President

Vaughan Henderson ZL1TGC
<vaughan@bidecphone.co.nz>

As most of you will know by now, Roy Symon ZL2KH resigned as President of our Association on Monday 20 February. Roy had served as President for the last three years and was completing his last term, due to finish at the 2013 Annual General Meeting. Roy has tendered his resignation as President for personal reasons and in accordance with Section 4.2c of our Constitution, as Vice-President, I have now become the new President.

I would like to thank Roy very sincerely for the time and energy he put into leading the Association for the last three years. He met the challenges that arose with a certain flair and leadership style tempered with his unique sense of humour. Thank you for all you have done Roy and I am sure you will enjoy our great hobby all the more now that you have a little more time to devote to it.

My taking on the position of President has created a casual vacancy in the Northern electoral district and I'm very pleased to be able to advise that Neill Ellice ZL1TAJ has agreed to join us on Council to fill this vacancy. You may recall that Neill narrowly missed out on being elected to Council during the last round of elections. Please give Neill a warm welcome, as I am sure he will bring to Council some new ideas and a fresh perspective which will serve us well.

On Saturday 25 February Council met in person for the day at Wellington Airport. The one day meeting went well with a number of matters dealt with and decisions reached. There will be seven remits to our AGM in Nelson and Council considered these at the Saturday meeting. Two of the remits have been referred back to the originating branches for minor re-wording and in one case for a possible withdrawal as the matter addressed in the remit is outside of Council's control. Remits for our 2012 conference in Nelson are in this issue of *Break-In*.

A decision from the meeting which will have an impact on several branches is that repeater and beacon licences currently held in the name of NZART will be handed back to those Branches who own and operate our many repeaters, beacons and fixed links. The current system of invoicing and renewals means a heavy administrative workload for FMTAG and also at headquarters at a time when subscription renewals are also being processed. This will mean that this coming November when the individual licences are up for renewal, each branch will receive the licence renewal invoice direct from the MED. Branch secretaries will need to be aware of this and ensure that payment is made by the due date. Failure to do this may result in the licence being cancelled. FMTAG will be contacting the Branches concerned to let them know of this change in licence ownership and to assist with the changeover. If your Branch does not want to make payment direct to the MED, then the licence can stay in the name of NZART. You will be advised of the requirement to make payment to NZART for the licence, and once paid, the fee will be paid to MED; this is the same as the process we have been using for the past several years, with one small change, your Branch will be invoiced for the full amount of the licence and the prompt payment discount offered by the MED will be retained by headquarters to offset the administrative overhead. Can I encourage your Branch to look at taking ownership of the licence(s) when you receive the details from the FMTAG Secretary.

Council considered the addition of a practical component to the existing amateur examination but after some discussion decided that providing guidelines to branches on how to conduct some practical instruction to newly qualified amateurs was a better approach. Warren ZL2AJ will be making these available when complete. Also on the subject of the amateur examination, one of Roy ZL2KH's actions was to get clarification from the MED's Radio Spectrum Management division on a common question bank for the amateur examination. The ministry will shortly be releasing an update to PIB46 which will identify the NZART question bank as the common question bank to be used by all amateur radio examiners. HQ Infoline number 246 which was issued on Friday 2 March has further detail on the NZART examination processes and policy. If you have not had a chance to read this, you can download it from the NZART web site at <www.nzart.org.nz>.

The Ministry of Economic Development has also delivered some more good news in the form of the list of amateur call-signs with names, address details, etc., from their database. We have been asking for this listing for many months and not having it available last year lead to Council's decision not to produce a *Call-Book*. This year, with the availability of the listing from the MED, we will be producing a *Call-Book* so look out for that in your letter boxes in the latter part of this year. This list will also allow us to run new member promotion which I hope will result in a significant increase in Association members. Debby our Business Manager will have more details of the promotion in the near future.

On IARU matters, I'm pleased to report that after careful consideration of the costs involved, Council has approved a budget of $7700 to cover the cost of one Delegate and one Observer to the IARU Region 3 Triennial conference to be held in Ho Chi Minh city, Vietnam from the 5 to the 9 of November this year. Council has specifically asked our Administration Liaison Officer Don Wallace ZL2TLL be one of those who attends. I know some of you will be unhappy with this decision to send two people and Council is very mindful of the cost involved. NZART has a proud record of effective participation at the Region 3 IARU Conferences and I expect that this year's conference will be no different. The conference will provide us with an opportunity to lobby and seek support from the other member societies in Region 3 for a possible new band at 5 MHz. It is through regional meetings like this one that the amateur service can speak with one voice; getting the member societies to in turn seek support from their administrations, so that when the next WRC takes place in 2015, there is a body of support from member nations for the amateur service and its request for a band at 5 MHz

The other significant international conference this year affecting amateur radio was the recently concluded World Radio Conference in Geneva. Our ALO, Don Wallace ZL2TLL attended as part of the New Zealand delegation. Reports from the ITU indicate that the Conference was a resounding success, having achieved consensus on all technical matters as well as on other, more difficult issues. From the perspective of the amateur service there were two very positive outcomes. The first of these was the decision to make a worldwide allocation of 7 kHz of radio spectrum on a secondary basis in the 600 metre band, from 472 to 479 kHz. As a secondary user, amateur radio shares 472 to 479 kHz with the Maritime Mobile Service which is the primary user in all three ITU Regions and with the Aeronautical Radionavigation Service which is a secondary user in most countries. A footnote to the ITU recommendation says that the power which radio amateurs may use in the 472 to 479 kHz band will be limited to 5 watts effective radiated power. This is less than we had previously negotiated with the MED and it may still be possible to retain the higher ERP for use in New Zealand. It is of course up to individual administrations to authorise the use of this new band by their amateurs and Don ZL2TLL has this task already in hand.

The second positive outcome was a paper from the Cuban administration which succeeded in getting the provision of an allocation for radio amateurs around 5 MHz on the agenda for the next WRC in 2015. The document requests "the possibility of making an allocation of an appropriate amount of spectrum, not necessarily contiguous, to the amateur service on a secondary basis within the band 5250 to 5450 kHz." While this is still a little way off, it "opens the door" for a possible worldwide amateur allocation in the not too distant future. Don will be reporting more fully on these and many other matters with potential to affect the amateur service at our Conference in June. On behalf of you all I would

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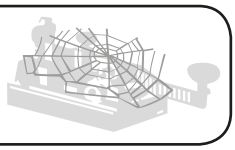
Silent Keys

The Association deeply regrets to record the death of the following members and extends its sympathy to the bereaved.



Silent Keys: guidelines to contributors

Contributors are requested to limit their obituaries to between 200-400 words. Content should focus mainly on the amateur radio activities of the deceased. Normally photographs cannot be included.

John Ottaway – ZL2BLC

Branch 18 has lost a valued member who was always ready and willing to help out on working bees that included anything from painting to steel fabrication. John was born in 1919 in Southampton. At 14 years of age he was indentured as a Plater (Boilermaker) with the ship builder Thorneycroft & Co finishing his time in 1939 as war broke out.

His interest in radio started with a crystal set and later, with a better radio, he would listen around the short wave bands and discovered that there was an active group of amateurs that he would listen out for regularly. Together with some of his local friends, they spoke with some of these hams using obsolete military equipment. So John was a pirate as he was not licensed!

John and his fiancé Peg, were married in May 1942. By the time they decided to migrate to New Zealand they had two sons and a daughter. John was able to secure work with the Engineering company, Cables in Petone.

In 1975 John turned to Amateur Radio. He joined the Hutt Valley Branch 18 and attended classes for the Grade III Post Office exams. In November 1980, he passed and was allocated ZL2TIR. He eventually passed the Grade I exam in 1983, one year before he retired and was allocated ZL2BLC.

John was a keen fisherman. Branch 18 Field Days found him using his casting skills. String lines were cast high up in the trees, to raise the 80m and 40m dipole antennas at the Brookfield Scout Camp in Moores Valley.

At the home QTH, HF Yagi beams would appear on top of the green, home-made mast in the rear of their Belmont garden. However, on washing days, it would have to be rotated away from the washing underneath and the birds perching above!

Computers were a fascination and a great hobby and let amateur radio interests be combined. RTTY, FAX, WACARS, and other data, could be received on HF, then decoded on the computer. Weather pictures, and OSCARs on VHF, were just some of the modes and bands operated by John. Genealogy was another interest. The world of HF was really discovered when his Grade II and I Licences were obtained. His files had hundreds of QSL cards, and he had several Log Books filled with numerous entries. ARRL and RSGB Certificates and awards were evidence of hard yakka!

The move to Hammerton Street, on the other side of Hutt Valley, saw a change in his interests. The HF bands were replaced by satellite TV reception. A moderately large dish and rotator enabled John to view TV broadcasts from several of the geostationary satellites accessible in New Zealand. The NASA broadcasts, showing live launches and images from the ISS as it happened, were in more detail and duration than those covered by our local TV channels. Internet and fast Broadband kept him in contact with friends, using the new modes for amateurs on this medium.

We shall miss John, his dry humour and knowledge. He was a great friend. John's wife and soul mate, Peg, died in 1998 leaving John to take over the care and support of his son David. John died on the 18 December 2011 aged 92.

The Hutt Valley Branch extends members' sympathy to Jack, David and Anne.

Acknowledgements: Ottaway family.

Barry Warner ZL2HO,
Bernard Wright ZL2QZ

Cyril Ingham ZL2TAK 1922-2012

Cyril was born in Burnley, Lancashire, England. He first met his future wife, the late Rose, at high school. Later, they both studied at the University of Manchester Institute of Science and Technology. Rose qualified as an optician and joined her father's practice; Cyril qualified as a pharmacist, following an apprenticeship in his father's pharmacy. He opened his own pharmacy (and married Rose) in 1944, living above the pharmacy in a Coronation Street-like row of shops and houses. Their first child was born in 1946. In a relatively short time, both Rose and Cyril became Fellows of their respective professional societies.

As a teenager, Cyril was keen on still and movie photography, electronics and printing. As a result, an in-house develop-and-print service, and a movie film library, was soon added to the pharmacy. In his spare time he designed and constructed an optical sound head for his silent movie projector.

Cyril, Rose, and by now two children, emigrated to New Zealand in 1956, eventually settling in Christchurch. Cyril briefly worked as a pharmacist before becoming the South Island medical representative of a major international pharmaceutical company. It was here that Cyril first became involved with short-watve listening and Amateur Radio, with Branch 05.

Work transfers meant that he, in turn, joined Branch 63, Branch 18 and Branch 74, on his way to establishing and becoming the General Manager of the New Zealand pharmaceutical factory of the same company.

While at Branch 63 he obtained his Amateur Licence in 1963. He declined many invitations to apply his management skills to the various branch committees, prefering to work in the background, and support the education, hobby and work activities of his, by now, five children.

Cyril was heavily involved in fund raising for the Belmont repeater site, and the National System, through the hand printing of custom QSL cards for Amateurs and short-wave listeners.

Rose, his long-time love, predeceased him in 1998, leaving a big hole in his life, partially filled by an ever growing number of grandchildren.

Cyril is survived by five children, six grandchildren, and one great grandchild.

Doug Ingham ZL2TAR

◂ *continued from page 3*

like to thank Don very much for his hard work on our behalf during the month long World Radio Conference and also acknowledge with thanks the preparatory work done by Peter Lake ZL2AZ in the years leading up to WRC 2012 which undoubtedly contributed to this successful outcome.

Finally, can I remind you all that now is a good time to get your registration in for our annual conference and annual general meeting being hosted by Nelson Branch in Hamtastic Nelson. Registrations close on Sunday 20 May and you may miss out if you leave it too late!

Vaughan Henderson ZL1TGC,
President, NZART (Inc.)

Breaking news!

I am delighted to report that Marlborough Branch 22 has made a donation of $1000 towards the cost of sending our ALO, Don Wallace ZL2TLL to Geneva for the World Radio Conference. This is a very generous donation and I would like to thank the Executive and members of the branch very much.

Titanic Anniversary

The 15th April is the centenary of the Titanic disaster.

The March *RadCom* claims this was the first time that Morse Code saved so many lives at sea. This is wrong. In 1909, in the Republic/ Florida collision, over 1500 people were on the two ships; 6 lives were lost.

On the Titanic 2223 were on board and only 712 were saved.

From ZL3SJ

Working with Coaxial Transmission Lines and Connectors; Part I of II

By David Conn VE3KL

(Reprinted from The Canadian Amateur, Jan/Feb 2011)

(Note: This article uses TCA HotLinks to provide access to enriched media from the RAC website. For more information, please go to <www.rac.ca/tca. Jan/Feb>*)*

Introduction

Transmission lines and connectors are used by all of us in our radio/antenna systems. They are many problems associated with them such as corrosion, broad manufacturing tolerances and unknown characteristics. Many of us have purchased a roll of coaxial cable at a flea market that is quite old and probably does not have a brand name label marked on it. So, how can we determine if the cable is worth using with our expensive radios? Even new cables are suspect if we cannot find the manufacturers' specifications and tolerances.

These articles address the above problem and show methods for selecting, testing and maintaining cables and connectors. Simple tests include the use of a DC multimeter to measure the resistance of a shorted cable or the use of low frequency L-C meters to check out the cable impedance, length and velocity factor. These tests do not tell you much about the cable performance at high frequencies so we can use a simple low cost RF SWR meter to gain more information. However, the best way to collect the data is with a vector impedance meter (one port) or to use a very expensive vector network analyzer (two port). These two port vector network analyzers are used by a few amateurs but very complex calibration methods are needed to make full use of them. However, high quality multi-port vector network analyzers are being developed for amateurs at a reasonable price.

Outline

Part I of this series presents the basic ideas used in the articles and shows how to make simple measurements (impedance (*Zo*), Velocity Factor (VF) and cable diagnostics) with the aid of a digital multimeter and low frequency L-C meter.

Part II of the series discusses more advanced methods of characterization using SWR and vector impedance meters. Typical measurement instruments used for the characterization are shown in Figure 1 which shows a simple L-C meter, a SWR/Z meter and a full vector impedance meter. An Excel calculator, see TCA Hotlink, 1 is supplied for your use as the calculations can be quite tedious if done by hand or with a hand calculator.

The Basics of Coaxial Cables

Coaxial cables are essential components of most radio stations. Ladder lines and twisted pairs are also used by many amateurs and they are described by the same parameters. There are many Web sites that contain the essential elements of coaxial cables and their applications. Some of these can be found in TCA Hotlinks, 2-6. This section presents a brief outline of the key parameters of coaxial cables and discusses how you can measure them.

The key electrical parameters of coaxial cable are:

The DC resistance. This parameter determines the overall loss of the cable. Usually, loss caused by the cable dielectric material is quite small. The resistance is easily measured with a simple digital multimeter. The DC resistance of the cable is a good indicator of the age/corrosion/manufacturing integrity of the cable. As cables age, they tend to degrade to the point where they should be replaced. It is especially important to pay attention to this parameter if you use an old cable or purchased an undocumented cable at a flea market. Before performing any electrical tests on a cable it is wise to inspect it for damage and corrosion. If there is a nick on the cable outer section, water can ingress into the cable and cause serious corrosion. You should peel back several centimetres from each end to see if the cable shield is clean and shiny. The DC resistance measurement also indicates if the cable is open or shorted. Telephone and cable television repair technicians work on broken cables on a continuous basis. They must also find out where the fault has occurred by using a time domain reflectometer, see TCA Hotlink, 7.

The DC resistance of coaxial cables is usually specified by the manufacturer. They give the resistance of the inner and outer conductor, for their product. For example, Belden RG-8X (9258) cable has a resistance of 14.1 Ohms per 1000 m for the inner conductor and a resistance of 10.8 Ohms per 1000 m for the shield. The total resistance that can be measured by shorting one end of the cable and measuring the input resistance at the other end will be equal to the sum of the two resistances (24.9 Ohms per 1000 metres). This means that a 15 metre length of cable should have a resistance of approximately 0.4 Ohms. With the cable open circuited the resistance should be several megohms. These simple tests will give you a good idea about the health of the cable. They detect shorts, opens and also give an indication of other unknown physical problems. If the DC series resistance is greater than 35 Ohms per 1000 m, the cable loss should be measured before installing it in your system. Table 1 shows the data for RG-58/U, RG-8X and RG-8/U from Belden and RG-9/U from ECI Electrocom.

The Characteristic Impedance, *Zo* . The characteristic impedance is the ratio of forward voltage wave to the forward current wave. Zo is a real number for lossless lines but becomes slightly complex for lossy lines. For example, RG8-X has a characteristic impedance of 50 –*j*0.2 at 100 MHz. We usually assume that the impedance is 50 Ohms for antenna design. However, this is a poor assumption at very low frequencies below 1 MHz. Generally, the characteristic impedance does not vary with frequency by any significant amount over our frequency range of interest. Most transmitters are designed to work with cables that have a characteristic impedance of 50 Ohms but there are many applications where other values such as 75 Ohms are commonly used. Fifty Ohm coaxial cable is a very good compromise between power handling and low loss. A characteristic impedance of 77 Ohms provides us with the lowest loss while a characteristic impedance of 30 Ohms has the maximum power handling: for air-filled cable.

▶ *continued on page 6*

Table 1 Coaxial Cable Characteristics

Cable	*Rdc/1000m (Centre Conductor)*	*Rdc/1000m (Shield)*	*L/metre [µH]*	*C/metre [pF]*	*Loss dB/100m @100 MHz*	*Velocity Factor*	*Zo * [Ohms] Calculated*
RG-58/U Belden 9310	30.8	26.2	0.295	101.05	12.46	0.66	54.0
RG-8X Belden 9258	14.1	10.82	0.2132	81.368	10.17	0.82	51.1
RG-8/U Belden 9913	2.95	5.91	0.1935	80.71	4.59	0.84	48.9
ECI Eletctrocom RG-59/U	Not Specified	Not Specified	Not Specified	53.4	9.5	0.78	80

Applications like cable television do not transmit high power levels so the preferred impedance is 75 Ohms. *Zo* can be measured with simple digital L-C meters or more accurately with vector impedance meters.

You might have a supply of unmarked coaxial cable, twin lead or even ladder line that you have on hand and are not sure about its characteristic impedance. Luckily, there are several methods that can be used to measure and calculate the characteristic impedance *Zo* of your cable. The first and simplest method is to use the following formula to calculate *Zo* :

$$Zo = \sqrt{\frac{L}{C}} \qquad [Ohms]$$

where *L* is the inductance per metre of a shorted line and *C* is the capacitance per metre of the same line but now open circuited. The formula given above is only accurate for lossless lines. However, the errors made for good transmission lines is quite small and can be eliminated with more complex measurements techniques that are discussed in part II of this series. Note that inductance is given in Henrys per metre and the capacitance is given in Farads per metre in the above formula. A check of Table 1 reveals that C = 101.05 pF per metre and *L* = 0.295 µH per metre for RG-58/U from Belden. This results in a *Zo* of 54 Ohms.

L and *C* can be measured with a simple L-C meter at low frequency. The line length should be approximately 0.01 wavelengths long at the measurement frequency. If the line is greater than 0.05 wavelengths, the above formula is not accurate. On the other hand if the cable is very short, the measurements will not be accurate because of parasitic capacitance and inductance adding to the measurements. An example is given in the measurement section that follows.

The next method of measuring *Zo* is to use a hand held SWR meter that has a feature to display the impedance *Z* = *R*+*jX*. In this case, the line is again measured with a short circuit and then with an open circuit connected to the far-end of the line. The frequency can be set to any needed value such as 28 MHz. The line length should be approximately ⅛ wavelengths at your frequency of interest for best accuracy. However, the length is not critical as long as it is not ¼ of a wavelength or odd multiple. The impedance in this case is given as:

$$Zo = \sqrt{Zoc * Zsc} \qquad [Ohms]$$

Here, *Zoc* is the measured impedance, (*R, X*) for the open circuit case and Zsc is the measured impedance, (*R, X*) for the short circuit case. Since *Zo c* and *Zsc* are complex numbers, it is best to enter the measured data into a calculator to make the process easy. A calculator is available for this purpose on my web site, <http://ve3kl.com/>, under the heading of Calculators (see Hotlink,1). The calculator also has the added feature that it logs all of your measurements into an Excel spreadsheet for future reference.

Velocity Factor. Another important parameter is the velocity factor which is determined by the dielectric constant of the insulator. This means that the wavelength in the cable is less than the wavelength of the signal in free space. This in turn means that the physical length of the cable differs from the electrical length. The electrical length of a cable is its length measured in wavelengths (λ). The main use of the velocity factor is in cutting stubs for antenna arrays and in designing filters based on transmission line stubs. It is also used to calculate the input impedance at the terminals of an antenna given that we know the impedance at the far end of the cable. Velocity factor can be measured with a simple digital L-C meter, an SWR meter with impedance capabilities or more accurately with vector impedance meters. Part 1 of this series demonstrates the use of L-C meters. Other methods are discussed in part II.

The velocity factor, *VF*, is defined as the ratio of the actual velocity in the cable to the velocity of light in a vacuum:

$$VF = \frac{v}{c}$$

Where *c* = the velocity of light in a vacuum, $3x10^8$ ms^{-1} and v is the wave velocity in the cable. *VF* is less than 1. See Table 1 for some examples.

Figure 1. Test Equipment; L-C Meter, Hand-held SWR/Impedance Meter, Computer-controlled Vector Impedance Meter.

The relationship between cable *c, L, C* and *VF* is:

$$VF = \frac{1}{c\sqrt{LC}}$$

Where *L*, *C* are the inductance and capacitance per metre as before.

So, all we have to do is measure L and C with a simple low frequency L-C meter and calculate *VF* directly from the above formula. The details on how to do this properly are given in the measurement section.

The second method is to measure the complex impedance of an open circuit cable with the aid of a vector impedance meter. The frequency, *f*, at which the input impedance becomes either a short or open occurs when the line length is an even or odd multiple of a quarter wavelength. As an example, an open cable that is one quarter wavelengths long looks like a short circuit while a cable that is two quarters of a wavelength long looks like an open circuit. *VF* can be calculated from:

$$VF = \frac{4 * Len * f}{n * c} \qquad n = 1,2,3,4,5\ldots$$

Where *n* is the resonance number. For *n*, 1 refers to a quarter wavelength, 2 indicates that the line is 2 quarters of a wavelength long and so on. The velocity of light in a vacuum is *c, Len* is the physical length of the line and *f* is the frequency. For example, if *Len* equals 10 metres, *f* = 5 MHz and *n* = 1, then *VF* = 0.667.

Cable Losses. Insertion loss of a cable is one of the most important parameters for our use with transmitters and receivers that are located far from the antennas. Losses vary with frequency getting larger as the frequency increases. This is one of the hardest parameters to measure as we will see later. However, a simple pass/fail test can be implemented with a low cost SWR meter. In most cases, we can rely on the manufacturer's specifications for loss given in dB/metre. Once we know the loss factor of cables, we can then select a proper one for our use. For example, RG58 has a loss of approximately 16 dB per 100 metres in the 2 m band so we can only afford to use a short section of it or better, use a different cable with lower loss. If we used 10 m of RG58 in the 2 m band, we will lose 1.6 dB of transmitted power and the noise figure of our receiver will increase by 1.6 dB. Cable loss will be discussed further in part II of this series.

Measurements of *Zo* and *VF* using an L-C meter

Here we use a short piece of cable to determine its characteristic impedance and velocity factor. The length of the cable should be approximately 2 metres and the measurement frequency should be less than 2 MHz. L-C meters usually use a test frequency of approximately 0.7 MHz or

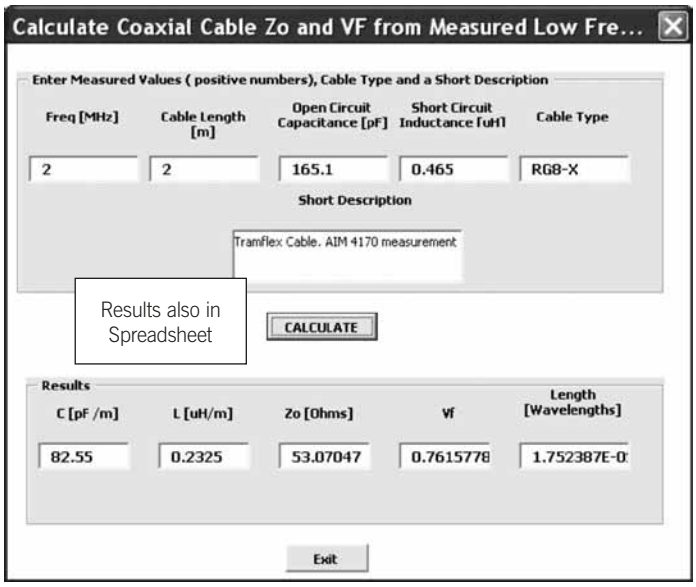


Figure 2. Screen Shot of VE3KL Cable Calculator. Example; RG8-X Cable.

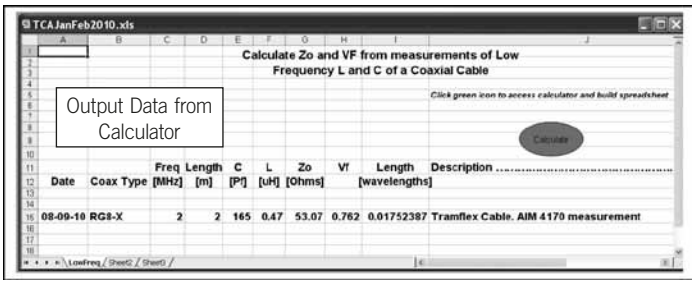


Figure 3. Screen Shot of Excel Spreadsheet Output From Calculator. Output Includes Date of Measurement, Coax Type, Description.

Table 2 Measured Results of Zo and VF

Cable Type/Meter	*Frequency [MHz]*	*Length [m]*	*C [pF]*	*L [µH]*	*Zo [Ohms]*	*VF*
RG8-X Tramflex Sample 1 Digital L-C	0.7	1.998	165.2	0.461	52.8	0.76
RG8-X Tramflex Sample 1 Aim 4170	2.0	2.000	165.1	0.465	53.0	0.76

lower depending on the values of L and C that are being measured. The example used here is a section of RG8-X 50 Ohm cable manufactured by TRAM®. First, an open section of the cable is measured for its capacitance. Then the cable is shorted at one end and its inductance is measured. In this example, the C = 165.1 pF and L = 0.465 µH. The calculation of *Zo* , *VF* and other parameters is then done with the aid of my calculator as shown in Figures 2 and 3.

Results

Table 2 shows calculated values of *Zo* and *VF* using two meters: the L-C meter and the Aim 4170 meter. The technique is the same but the measurement frequency is slightly different as shown. Note that the meters agree very well for these low frequency measurements.

Your success in measuring cable parameters will depend directly on the calibration of your meters. It is essential that you assemble a set of standard capacitors and resistors that can be relied on for calibration. Calibration standards are usually supplied by the manufacturer of the more expensive meters but not by low cost L-C meters and hand held SWR meters. I recommend that you use ceramic capacitors for your standards. The capacitors can range from 10 to about 250 pF for most applications. An example of one capacitor that I use is a 100 pF, 50 Volt, 5% tolerance radial lead ceramic capacitor from Digikey part number 445-4726-ND. Purchase about three items from each size. You don't need many sizes. A good start is to use 10, 25, 50,100, 200 and 250 pF capacitors or values close them. You can also assemble a simple set of standard resistors. Standard inductors are harder to find but for our needs, we can use a shorted section of a coaxial cable for small inductors.

Use of VE3KL Cable Calculator

A calculator for *Zo* and *VF* of cables is posted on my web site for your use. This is an Excel based calculator which has been tested for Excel 2003 and 2007. Simply download the spreadsheet and click the green calculator button to enter into the calculator form and insert the measured values and comments. Note that the exact frequency of measurement is not needed. It is simply used to check that the transmission line is not too long as outlined above. The Excel spreadsheet uses "Macros" so you must have them enabled in your Excel program. If you have not used " Macros" before, use the Excel help file to find out how they are enabled. The process is slightly different for Excel 2003 and 2007.

Concluding Remarks

Part I of this series presented the basics of coaxial cables and simple methods that you can use to measure and maintain them. These methods only use a multimeter and a low cost L-C meter that most Hams either own or can borrow from their friends.

The second part of the series expands the ideas presented in Part I to include more measurements with the aid of SWR and vector impedance meters that are available at relatively low costs. Part 2 also updates and expands the coaxial calculator of VE3KL to include many more features related to the measurements of transmission lines.

Further Study Using TCA Hotlinks

Further information is provided with TCA hotlinks which are easily accessed via the RAC website. For this information, please visit <http:// www.rac.ca/tca>. Hotlinks make it unnecessary to type URL addresses into your computer and provide you with calculators and other support that demonstrates the ideas presented in the articles. The following hotlinks for this article are available on the RAC site.

TCA Hotlink 1 Low Frequency Coaxial Cable Calculator VE3KL <http://ve3kl.com/>

TCA Hotlink 2 Electrical Characteristics of Transmission Lines <http://cyberhughes.com/PDFs/Smith_Chart/TLChar.pdf>

TCA Hotlink 3 Coax Cable Basics <http://en.wikipedia.org/wiki/Coaxial_cable>

TCA Hotlink 4 What does RG-6 Mean? http://www.bluejeanscable.com/articles/rg6.htm>

TCA Hotlink 5 Why use 50 Ohm coaxial cable? <http://www.microwaves101.com/encyclopedia/why50ohms.cfm>

TCA Hotlink 6 Impedance Measurements and RF Experimentation. <http://www.seed-solutions.com/gregordy/Amateur%20Radio/W8WWV%20Experimentation.htm>

TCA Hotlink 7 Time-domain Reflectometer. <http://en.wikipedia.org/wiki/Time-domain_reflectometer>

Until later, VY 73 βi

David VE3KL

NZART Radio Science Education Trust Application for Grant-in-Aid

Applications are invited from secondary school science teachers and other training providers for Grants-in-Aid from the NZART Radioscience Education Trust to promote the development of projects in the general areas of radio and/or electronics. It is anticipated that these projects will lead to entries in the local area Science & Technology Fair. Grants will not normally exceed $250.00

Applications should normally be received no later than 30 May of the year of application. Application forms maybe obtained from; The Trustees, NZART Radioscience Education Trust, PO Box 1733, Christchurch 8140, or from <trustee@nzart.org.nz>. Applications should be endorsed by the Head of Science or, for other organisations, the President/Chairpserson.

Every kid in the country will have one! Considering some training and testing issues in the quest for more radio amateurs

by Fred Johnson MNZM, ZL2AMJ, ARX2106.

The ITU Radio Regulations give the official definition for the "Amateur Service" as: "A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs…" (RR 1.56): Self-training is quoted first and foremost.

Material for self-training is downloadable from the Web to satisfy the "get-up-and-go" of individuals working alone to become radio amateurs, or for individuals to use in any-size class groups helping each other. Any radio amateur can use this same material and be an Instructor, "Mentor" or "Training Officer" to one or to any number of students. All that is lacking is the motivation to pick up what's available and use it.

Every school student today seems to carry one or more cellphones. From observation and discussion, a current flavour of the day, and the envy-item in the class, is the "smartphone" from any one of many reputable manufacturers.

If "every kid in the country has one", is there a system available for the distribution of Amateur Radio promotional and training material to the school student population to use on their cellphone viewers? Many distribution avenues seem possible. Ideas on how this could be implemented are welcome. Short downloadable publicity videos of the You-Tube variety about New Zealand Amateur Radio are suggested. Your ideas and your finished products will be welcome. Help to "Spread The Amateur Radio Story"!

The latest revised "Study Guide" with its question-bank is being extended and developed to run on the smartphone and on eBooks including the Amazon Kindle®. Some experimental files will soon be made available from the web for you to try. The material will be useful to anyone of any age and background who wishes to become a radio amateur. For regular study and self-testing with the question-bank questions, use a cell-phone screen as an eBook while travelling on the bus or train!

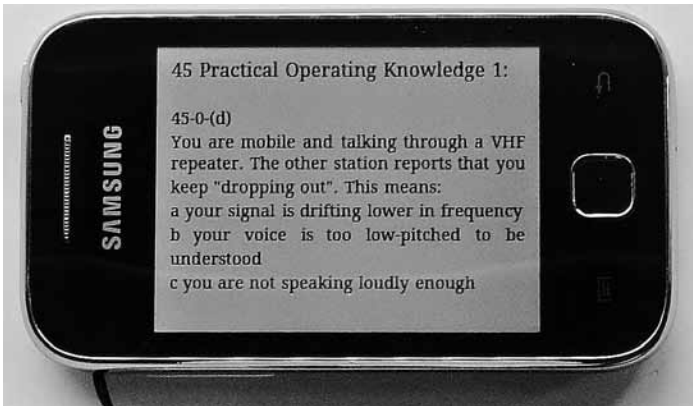
The latest version of this revised examination and study material is at: <http://littleurl.info/svg>. It explains all the examination requirements, the syllabus details and the examination procedure to become a radio amateur. A Study Guide with the regulations and theory is provided with a sample examination paper. The full question-bank is presented in three guises to provide the self-testing facility. Enquiries to: <zl2amj@nzart.org.nz>. (An earlier Alternative Version is from the NZART website at: <http://www.nzart.org.nz/exam/online-info/> scroll down.)

The files can be downloaded from the web then printed and "bound" into three volumes, as shown on the web page. All-up, 154 A4-size sheets printed double-sided are involved. When home-printed, several "Bull-dog clips" can be used as the binding agent for each volume. These are cheap from "two-dollar" shops. Their wire "handles" can be removed once the clip is put in place.

If you take a printed copy of the binding diagram copied from the web, with the six files on a flash drive to a commercial stationer, you can get as many bound copies as you order and pay for, and with transparent cover sheets. A quote around $30 a set is typical. It is a better buy than a textbook, everything is complete and tuned to the local examination and its requirements.

Regular self-testing using a random-selection of questions from the question-bank for self-testing on-screen or off-screen supports the learning process. The time soon arrives when a candidate feels adequately prepared and confident for tackling a real examination. Examinations can be arranged at some convenient venue and time.

With this study and training material, any qualified radio amateur in any radio club or NZART Branch of any size, anywhere, is now a potential instructor or mentor for any number of students, from one to many. Your Club could offer this service to your local community.


SAMSUNG
45 Practical Operating Knowledge 1:
45-0-(d)
You are mobile and talking through a VHF repeater. The other station reports that you keep "dropping out". This means:
a your signal is drifting lower in frequency
b your voice is too low-pitched to be understood
c you are not speaking loudly enough

Sample Cellphone Display.

This presentation and the question-tracking system used makes the student's study time effective. Studying *AMATEUR RADIO* is "less of a drag" and more interesting for the student. When the time is right, an examination paper and other material can be ordered by the local Supervisors for your examination. It is delivered already packaged and ready for exam-room use.

The training material is flexible and can be for individual self-study by the study-alone student, or for weekly classes, or for week-end sessions. It can be used in its hard-copy form or viewed on-screen. The screen can be any size, a laptop or larger computer, or small personal "Smartphone" size.

The question-bank is also provided in a "Summary" presentation. Each of the 600 questions in the bank has been stripped of its "distractors" so that it reads as a statement. The rubric (stem) is followed by the correct answer choice. This statement format can be "read" by text-to-speech programs such as "Jaws", used in computers by the visually impaired, or by similar methods as provided in the Amazon "Kindle®" and other eBook devices.

Individual study progress can be monitored by fast self-testing and self-scoring, on-or-off-screen, with random-selected questions taken from the complete question-bank. Hand-out notes on "session topics" can be produced to help any qualified radio amateur to be a Branch Instructor or Mentor to provide helpful training and instruction for examination candidates while keeping to the syllabus requirements.

These files are easy to maintain and to update by the Approved Radio Examiner as regulatory and other circumstances change. So, it is all ready and maintained for you!

Audited by the Radio Spectrum Management Group of the Ministry of Economic Development, peer-reviewed by experienced Instructors, it has been used by many candidates. It is flexible and can be modified as technology and regulations change. Several ARX's are active in supporting its use so the service is prompt.

You are invited to take the opportunity and, with your Branch, introduce others to our great experience – *AMATEUR RADIO*! Everything you need is prepared and is ready for you.

A new Training Year is about to begin! Be an Instructor/Mentor/Trainer! Additional help can be given if requested. Enquiry details are on the website. We're all here to help with the training of persons who wish to be Radio Amateurs.

So, let's get on with it! "Spread The Amateur Radio Story!" βi

Kiwi Spotter

by Graeme Hunt ZL1ANH

While not strictly amateur radio, this device and applications may be of interest. For some time we have been finding Kiwi holes around our property. The Kiwi makes these holes, which are up to 100mm deep, as it chases worms. My XYL wasn't too happy about sitting in the yard all night to spot our visitors so some ham radio ingenuity was required.

A passive infra-red detector (PIR) "sees" the Kiwi, and switches a small FM transmitter which is received in the house. We then creep outside to spot the intruder.

Circuit description

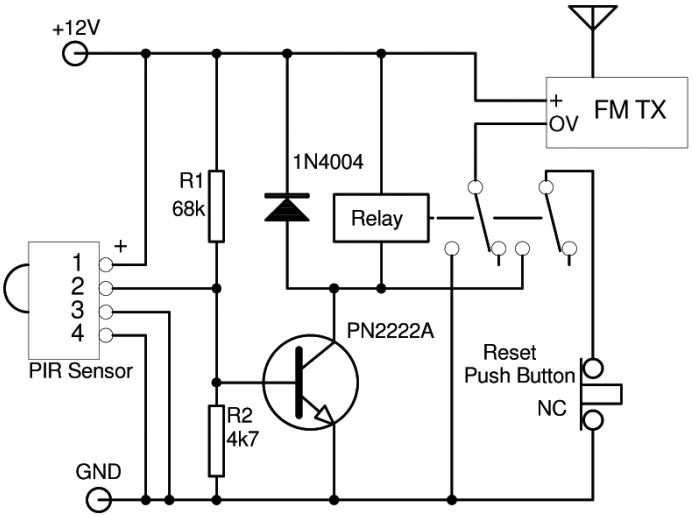
The PIR I found in the junk box uses 12V, as do most of them, and when searching the control output sits at 38Ω. When an object is detected the control output goes open (infinity). This change is used to switch a relay via PN2222A; most NPN transistors will do the job if a low current relay is used.

The PIR places 38Ω, which is almost a short, at the base of PN2222A (base – centre pin 2). When the PIR detects and the control goes high, the base voltage at #2 rises to around 1V, derived by the voltage dividers R1 and R2, causing the PN2222A to conduct and close the relay. The whole circuit draws less than 20mA when searching, and on detection the current will depend on the device you use in the output.

Because the PIR control on detect only goes high for 5 seconds, it is necessary to latch the relay; this is done by grounding the bottom end of the relay coil with one of it's own contacts. The other contacts are used to supply the negative for the output, although there is no reason why that switch couldn't supply the 12V+ or a 240V AC device.

A manual switch/push button is in the latching circuit to re-set the device after detection. Although a less common normally-closed/momentary-open switch is shown, any off/on switch will do the job, just break and make the circuit to re-set. Some PIRs send detect signals at start-up, this of course turns the TX on. I wait for 20 seconds after initial turn on before doing a re-set. The diode across the relay is to prevent the induced voltage becoming high enough to damage the transistor and power diode will do the job.

The small FM transmitter I am using normally plugs into the car cigarette lighter, has our music on a memory stick and it runs through the car FM radio. The transmitter I use seems to have a range of about 20m and of course can be received by any FM receiver in the house. They are "Car MP3 players with FM Modulator", and new ones are on TradeMe® for around $16. They can be tuned to anywhere on the FM broadcast band.



Pin 1 +12V
Pin 2 and 3 Open on detect
Pin 4 -ve

The PIR I used had a bright red LED to indicate detection so I placed black tape over that as it lit up the area for several metres. Ignore the tamper switch outputs.

I use my Yaesu FT857 as the receiver, which is a bit of an overkill, but it has good squelch and is in a central part of the house. So at least there is a ham radio component to this article, however any FM receiver will do the job.

The Kiwi Spotter could drive a range of other devices like lights and alarms. Next project is to get the device to determine whether it was a Kiwi or the neighbour's cat that went through the beam; now there's a challenge. βi

Around the Branches

Amateur Radio Youth Group/Society Starts

In the face of adversity there is always positivity. At least that is what we say here from the Christchurch Branch 05 Youth Group.

Last year new Hams Oliver Jenks ZL3ODJ and Aidan Barnsdale ZL3APB wanted to unite all young and new hams together through a society. At first I thought nothing of it, thinking it was not going to become anything more than a little fun the two would have. But these young teenagers had commitment; no matter what got in their way they were determined to make a real society nationwide.

So I thought to myself that maybe this idea of making a society for the Young and New would prosper and Grow with some support. Helping Oliver and Aidan in their efforts I went away and designed a website for their society, Of course not all young hams were located in Christchurch. So a website to bring nationwide hams together would be a great start. NZYAM was then born.

New Zealand Young Amateur Management now has a dream and vision for the future of New Zealand ham radio. The dream is to bring almost every young ham aged from 0-25into the society and get each other contacting one another. Of course what's more magical than being really young in a more adult based hobby and finding someone your own age on the air. Speaking from experience I am telling you its a very rare occasion when it happens but when it does it feels really cool. NZYAM's vision for the future of the society is to become a big enough society to be able to arrange with NZART to host a Youth Field day, it may seem a bit much at the moment but with the huge support from adult hams it is possible to be able to be done.

So come and visit our website at <http://nzyamradiosociety.webs.com>. And if you are a Ham aged between 0 and 25 *please please* join us. We have a wonderful goal we would like to achieve and we need you guys to make that goal and dream a reality. Thank you very much from taking interest in our society and hope to see you on our website members' list.

From the NZYAM team we say 73's and see you down the log very soon.

Andrew ZL3AJT
Editor NZYAM

Contributions to Break-In

Break-In is a forum for NZART member's amateur radio projects, experiences, opinions and news. Your contributions and feedback is welcomed. Contact the Editor John Walker ZL3IB at <john.zl3ib@ihug.co.nz>

Longer Wavelengths

Con Wassilieff ZL2AFP
<zl2afp@nzart.org.nz>

OPERA mode for LF/MF

The OPERA mode protocols remain a closely guarded secret, although some clever reverse-engineering by Guido PE1NNZ has revealed most of OPERA's inner workings. In a nutshell, OPERA's coding consists of a 51-bit message based on the operator's call-sign; containing a 28-bit packed integer with the call-sign encoded in a particular fashion, a 16-bit checksum of the call-sign bits (CRC-16), and a further 3-bit checksum of the previous call-sign and its checksum. Four bits at the end are set to zero.

These 51 bits are then scrambled by means of an XOR operation with a pseudo-random sequence to reduce the chance of runs of the same bit, and then a Walsh-Hadamard code (k = 3) turns the 51 bit message into a 119 bit message. These extra bits provide forward error correction (FEC).

The message is then interleaved, and Manchester Encoded (encoding a 0 bit as a 1-0 transition, and a 1 bit as a 0-1 transition). This enables the receiver to reliably recover the clock. The downside is that the message is doubled in length. Hence our original 28-bit message becomes 239 bits long!

The modulation consists of on-off keying of a steady carrier at a symbol rate of 0.256n sec/symbol, where n is the integer operation mode OPn that corresponds with OP1, OP2, OP4, OP8, and OP32.

Hats off to Guido for such excellent detective work! Shame on the developers for keeping it secret! However, Cold War secrecy notwithstanding, OPERA seems to be very popular at the moment although tests find that it is less robust than WSPR and QRSS type modes. See reference[1] for a report on comparative tests. Figure 1 shows the results of tests with OPERA mode OP2 (2 minutes to complete the message) versus QRSS3 and WSPR (also 2 minutes to send the message), as a function of decreasing signal-to-noise ratio. The strong error correction of the "pure" digital modes (OP2 and WSPR) causes the copy to drop abruptly from 100% correct copy to zero copy, whereas the human readable (fuzzy) mode (QRSS3) shows a gradual reduction in correct copy.

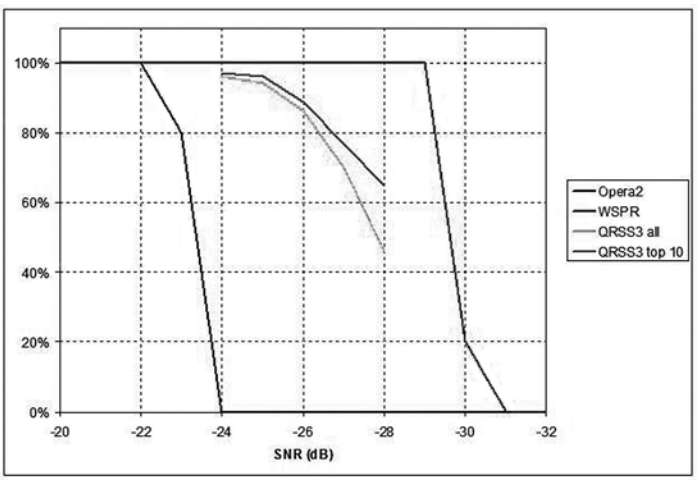


Figure 1. Decoding ability of OPERA vs QRSS3 and WSPR (from ref [1])

Proposed 630m band allocation

The ITU WRC-12 meeting recently agreed to 472 – 479 kHz becoming a worldwide secondary allocation to the amateur service, from the 1st of January 2013. For New Zealand 472 – 479 kHz will likely replace the temporary 505 – 515 kHz band. Any home brew gear and antennas should not take much retuning. Bob ZL2CA has carried out a preliminary search of frequency registers for licences held by primary users but found none in New Zealand, and only one in the far north of VK, so for ZL the new band is basically clear of incumbents. However, there is a 3rd order intermodulation product on 477 kHz which Bob has deduced as arising from Titahi Bay 567kHz (2YA) and 657 kHz (Southern Star) transmitters, so some bandwidth around 477 kHz is not so good for Wellington amateurs.

Maximum radiated power allowed ranges between 1W and 5W EIRP, depending upon locations near "sensitive" countries. ZL currently enjoys a 25W limit so this will be a challenge if the limit is applied locally. Some countries (eg all of northern Africa) have no 472-479 kHz allocation. Interference with NDB's (navigation beacons) is cited as one of the reasons for no amateur allocation.

Titanic event

A special broadcast on 147.3 kHz and a radio amateur crossband event (on HF) will be held in memory of the sinking of the RMS "*Titanic*" on the 14th of April at 22:30 GMT. The transmission will run until 15th of April 02:00 GMT, with the Deutscher Wetterdienst (National Weather Service) transmitter DDH47 on 147.3 kHz in morse code. During "silence periods" of the former maritime radio service the names of radio officers (presumably those associated with the sinking) will be sent in QRSS3. See reference [2] for more information.

600m net

From the end of daylight saving the Thursday evening 600m net will return to weekly operation, as the reduced daylight hours will mean more useful propagation during the evening. The coordination net is on 3666 kHz starting at 8.30pm.

Noise reduction filter

Recently, with long daylight hours, propagation on 600m has been poor around the 8.30-9.00pm period, often with zero copy from all but local stations. In an effort to improve this wretched situation at my QTH, I wrote a computer program to apply some DSP (digital signal processing) filtering to the receiver audio, using the computer and its soundcard. This program was written mostly as a learning exercise in the C programming language. Over the years I have tended towards the BASIC language (via the excellent compiler and editor, Powerbasic) but the main limitation with using Powerbasic as my primary programming tool is that I have had to write everything myself, because there is not a lot of DSP code out there written for the BASIC dialect that I can pillage and plunder. On the other hand, there is a wealth of source code available for C, and variants of C, such as C++.

There is not a lot of real difference between C and BASIC, although Powerbasic has excellent string handling capability which makes it a good choice for many applications. Plain vanilla ANSI C has some string handling functions but nothing as sophisticated as those in Powerbasic. Having said that though, 90%+ of useful radio-related source code freely available on the "interweb tube" is written in C and this makes it a very attractive option for writing programs such as my new filter application.

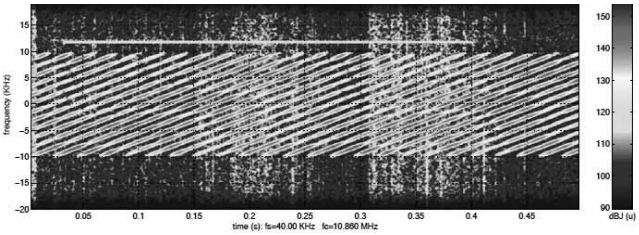
There are a few very good C and C++ compilers and editors available on the 'net (such as *Pelles C* and *Dev-Cpp*) so one can start programming in C for no financial outlay. Programs such as *Microsoft's Visual Studio®* cost $$$ and (I find) are awkward to use. Although I have an antique version of Visual Studio, I have never managed to get it to do what I want so have ditched it in favour of the free compilers. The nice thing about the free compilers is that, like amateur radio software written by amateurs, they are written with the end user in mind and are a charm to use. Most of the commercial stuff seems to have been put together by a committee from an asylum for the criminally insane.

Although still in an elementary development stage, my little filter has already earned its keep by winkling signals out of the noise on 508.1kHz, enabling signals to be clearly heard which were otherwise completely inaudible. The program uses the Fast Fourier Transform (FFT) as the main filter engine. So far it sports the following DSP features:

- Infinitely adjustable bandwidth bandpass and band reject filters, achieved by setting unwanted FFT bins to zero and applying a suitable window function (the idea for this derives from Lionel G3PPT and his *Binster* filter)
- Several notch filters, using the same zero-bin principle as above

Monitoring Service

Monitoring Service Co-ordinator: John Martin ZL1GWE
<john.martin@nz1.ibm.com>



Greetings to all, including Short Wave Listeners and contributors. We commence with this years initial NZART Top Intruder System Observer award league table for 2012. It has been a bit busy on this end, with the Hexbeam mast bolts shearing, but fortunately these have been repaired and now awaiting to put in place a couple of "L" shaped brackets to take the slight slack on the top plate. However it survived the latest "Weather Bomb" which is good. However, it did mean that I was without DF capability for a month or so. Traditionally Direction Finding Loops were the preferred method, however, as we will find, when I find sufficient time to resume my series of HF DF finding, that DF loops, have significant issues especially at night and also because of their size relative to full sized aerial systems. Currently I am tackling the issue of taking a Bellini-Tosi maritime radio crossed-loop and recreating a radio goniometer for measuring angles, which is an interesting research subject, but also interesting to replicate, from patents and old (I mean "old") books, which are quite rare these days. Ideally, the inductance of the crossed loops should be mutually close to the inductance range of the field coils for the goniometer. Ensuring it is accurate, is another matter. All of this of course, can be replicated in electronics and software these days, but is practical from an amateur radio perspective.

I have always wondered why an OTHR (Over the Horizon Radar) system looks as though it is interleaved with a number of signals. The realisation after reading various research papers, indicates they are in fact made up of a number of woven transmissions, in some cases up to 14 or more antenna arrays, which are brought together using beam forming techniques into a single transmission.

What this means is multiple transmitters and receivers are used to achieve very high precision target location using multiple transmitters and receivers to identify long distance targets. This technique is called Multiple-Input Multiple-Output or MIMO. The reason for using this technique is as we know that the ionosphere is imperfect for propagation purposes, although the whole purpose is to see "over the horizon". The ionosphere is multi-layered and this means there is multiple ionospheric routes to and from targets and lots of clutter sources or noise. This causes radar systems to degrade, which causes distortion to stationary terrain and moving targets, which are moving in a typical Doppler shift i.e. they are moving. This is in fact a limitation of OTHR systems and is apparently well known. OTHR systems are used for the measurement of targets, so there must be a coupling between the transmitters and the receivers for them to function well to identify the target systems clearly enough against the noisy background. They also use beam forming techniques, which is a form of ranging in terms of distance, like traditional microwave radar systems. Unfortunately OTHR systems will continue to be developed and the offshoot of this research, will find their way into CODAR systems, either fixed land based arrays or within buoys, as they are commonly used to protect international boundaries and for defence purposes. The fact that they sometimes intrude into the Amateur Radio spectrum, means it is still important that these intrusions are reported in a timely fashion.

We all know the inaugural winner of the first NZART Top Intruder System Observer Award for 2011 was Phillip ZL1TZE. Could you be the next one to win a free full membership to NZART for 2013? The person who contributes the most reports within 2012 will receive the next award. All contributions will be tabulated by me. Please report intruders to: <MS@NZART.org.nz> or <MS2@NZART.org.nz> or <IntruderWatch@GoogleGroups.com> to your favourite DX Cluster.

If you have any questions, do not hesitate to contact me directly.

John (ZL1GWE)

Reference:

Multiple-input multiple –output over-the-horizon radar: experimental results. G.J Frazer, Y.I Abramovich, B.A. Johnson. Institution of Engineering and Technology 2009 *Radar Sonar Navig*, Vol. 3. Iss. 4, pp. 290-303

- Noise reduction using the Least Mean Squares algorithm (in spite of its daunting name, it is easy to reproduce in source code)
- Adaptive comb filter for mains hum (this piece of code was "borrowed" from elsewhere!)
- AGC (also "borrowed")
- Noise blanker (again, "borrowed")

The soundcard full duplex operation (simultaneous audio input and output) was achieved using *Portaudio*, a suite of C source files that does all the hard work of synchronising audio input and output. All you have to do is include the appropriate files from Portaudio with your own source files when compiling the program and call the various functions from inside your own code. Portaudio stands for "portable audio"; and is used for Windows, Linux, Mac etc.

Most of the DSP operations in my program are activated by "point and drag" mouse clicks. All done in plain, universal C. Although written for the Windows environment, the DSP parts of the code are portable to other systems such as Linux. This is another advantage of writing code in plain C; it is portable across many platforms. Figure 2 below shows the main (and only) screen of the program.

I aim to write in this column a bit more in the future about computer programming in the hope that it might interest more folk to try it for themselves. It appears that computers will play an increasing role in the future of amateur radio (software-defined radio is one example), and we might as well be at the forefront (or at least close to it). It is a great way to get involved in technical development without getting solder all over the place!

Figure 2. ZL2AFP audio filter main screen [LMS filter screen]

Errata

The last column contained an error with the equation for the radiation resistance of a short vertical antenna. The correct equation is:

$$R = \frac{160\pi^2 h_e^2}{\lambda^2}$$

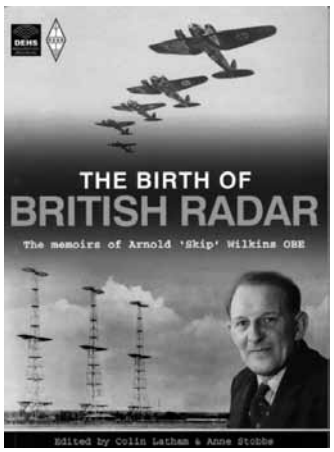
The somewhat mysterious comment "*Of special interest is the square law relationship of R with the effective height*" now should make a bit more sense! The text also has a mysterious phrase "*capacitively obvious*". Although this phrase is a first for the English language the "capacitively" should have been associated with an earlier sentence to read "A short vertical antenna is *capacitively* coupled to the ground".

References

[1] http://on7yd.strobbe.eu/QRSS/
[2] http://www.doese-apprt.de/mrd/titanic.html

Book review

The Birth of British Radar; The memoirs of Arnold 'Skip' Wilkins OBE



Second Edition 2011, Edited by Colin Latham and Anne Stobbs.
This edition revised by Colin Latham.
Published by RSGB in association with the Defence Electronics History Society.
ISBN 9781 9050 8675 7
Reviewed by Grahame Fraser ZL3SJ

The most significant piece of text in the book is in the copy (p.4) of the entry from the Churchill College Archives in Cambridge (UK). "Wilkins was asked to write his account by John Ashworth Ratcliffe as a counter to the official account by Watson-Watt "Three steps to victory; a personal account by radar's greatest pioneer" (Odhams, London, c 1957)."

In 1935 Robert Watson Watt and Arnold Wilkins were working at the Radio Research Station at Slough when they were asked to consider the feasibility of a radio death ray. While calculating the energy required for such an unrealistic weapon Wilkins calculated the energy when a radio wave was reflected from an aircraft, a known source of radio interference at the time. The Radio Research Station was using pulse transmitters to monitor the ionosphere, and crossed dipoles with cathode ray tubes to measure the direction of lightning strikes, so the basic principles for locating aircraft were known. But Wilkins' calculations showed that the 1 kW ionosondes were too low power to make a detectable echo. He knew that the BBC short wave transmitters at Daventry had much higher power and high gain antennas and with this combination confirmed his calculations using the CW echoes from aircraft on 26 February 1935.

Wilkins outlines the events leading up to the Daventry experiment. In the subsequent development of the UK radar Chain his main responsibility was the antenna design and the siting of the operational radar stations. He describes many other technical developments in establishing a successful chain of radar stations before war began in 1939. By 1938 successful secondary radar had been developed in the form of IFF (Identification Friend or Foe).

He also describes the practical application of radar in the unsuccessful Air Exercises with the RAF in 1936, and to the successful Air Exercises in 1937. The analysis of the 1937 Exercises at Biggin Hill is generally regarded as the beginnings of the new science of Operational Research.

The failed German spying mission in August 1939 used a Zeppelin airship which was the biggest echo seen by the radar chain which followed its track off the east coasts of England and Scotland.

Wilkins' original manuscript is supplemented by the editors' explanatory notes at the end of each chapter. They also wrote addenda at the end of the book about the development of radar during the war, about Wilkins' research at the Radio Research Station after the war, they report an interview with him in 1983, and include a section on "The value of radio amateurs ('Hams')".

As well as the detailed technical descriptions of the successes and failures as radar developed, there are many intriguing comments on the personalities involved in radar and on the differences of opinion between them.

The book is an entertaining and informative history of radar development and its application before the introduction of microwave technology.

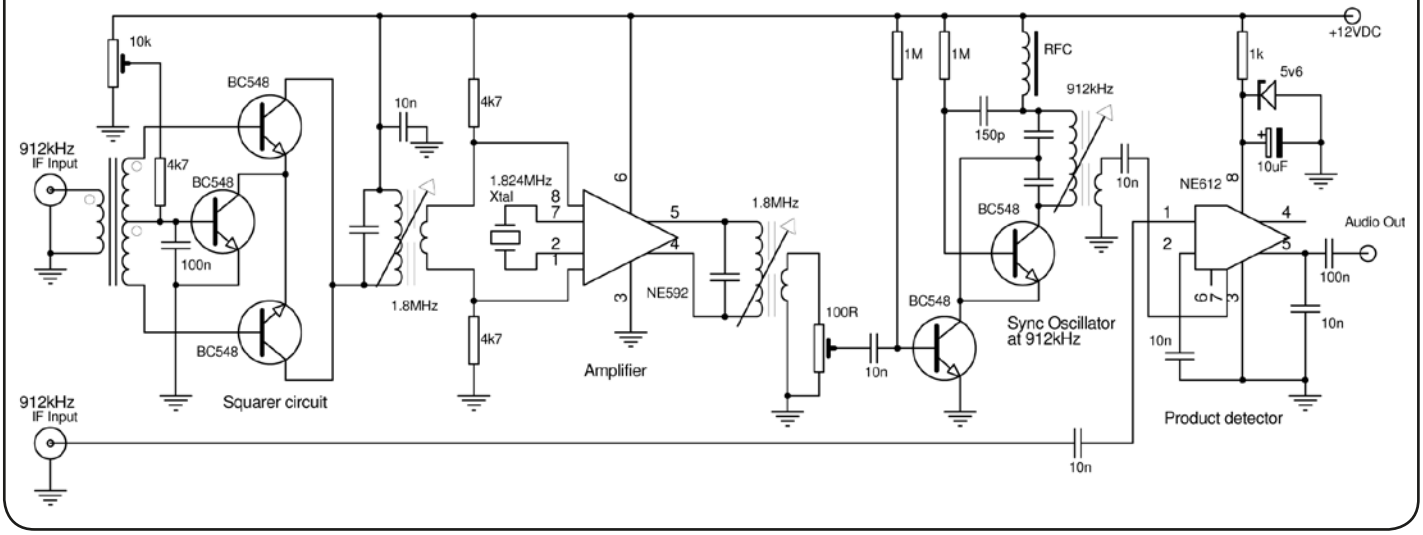
Note: The Defence Electronics History Society web site is <http://www.dehs.org.uk/

Errata —

A DSB sideband demodulator; the Mk3 sqaring loop.

Unfortunately the circuit diagrom was omitted from this article in the January/February 2012 Break-In. It is reproduced here. My apologies to the author and readers.

John Walker ZL3B, editor



New Zealand Association of Radio Transmitters Inc
National Conference
Tahuna Conference Centre Nelson

Notice is hereby given that the Annual General meeting of the Association will be held at the Tahuna Conference Centre, Nelson.
Saturday 2 June 2012, commencing at 9am

Annual General Meeting Agenda

1 Welcome
2 Meeting Schedule
3 Apologies
4 Silent Keys – minute's silence
5. Confirmation of Quorum
6 Report on Council Business
7 Minutes 2011 AGM
8. Annual Accounts and appointment of Auditor
9. Officers' Reports as published in *Break-In*.
10. Voting Procedure
11. Remits
12. Presentation of Rothschild Cup
13. Fixing of Venue for 2013 Conference
14. Presentation of Awards
15. General Business
16 New Councillors present thank you to Retiring Councillors
18. Stirrer's Award.

Debby Morgan ZL2DL
Business Manager

President's Annual Report 2011

Council met for a one day face-to-face meeting in February and also had face-to-face meetings on the Friday and Monday of Queen's Birthday weekend during the conference we enjoyed in Silverstream. As well as these meetings, council also met monthly on air.

During the year Ann Fraser, ZL3TNT, resigned as a Midlands District councillor. From those who voted, council held an election by email and appointed the person receiving the most votes; Stuart Watchman ZL2TW, to fill the vacancy.

At the 2010 Association AGM in Auckland a remit was passed that NZART ask for an increase in power to 1 kilowatt. RSM have agreed to this and 1 kilowatt PEP is now the maximum power permitted on most bands.

No *Call-Book* was produced this year because RSM could not provide us with accurate data. This lack of accurate data from the SMART system also caused the cancellation of our planned membership drive.

The re-writing of our constitution to meet the requirements of the Charities Commission is being progressed.

Another area of significant expense is the funding of delegates to overseas conferences such as IARU regional meetings and the like. Don Wallace ZL2TLL, our administration liaison officer, will be attending WRC12 in Geneva.

An area that still needs much attention is membership, recruitment and retention. Amateur radio is being seen as an anachronistic hobby, having been largely replaced in the mind of the general population by cell phones, the internet, and more modern technology. If we stand back and look objectively at where we stand in the minds of others, we are an aging minority who can conveniently be ignored. This image needs to be changed. What is the future of our hobby in the decades to come?

My grateful thanks go to our very capable Business Manager, Debby Morgan ZL2DL, and our treasurer, Evan Sayer. We are lucky to have people of this calibre. Thanks also to all councillors, officers, and others who have given up their time and expertise to make sure our hobby thrives and prospers.

Roy Symon ZL2KH, NZART President

Business Manager/General Secretary's Annual Report 2011

Membership

Membership categories as at 31 December 2011 with comparative figures for 2010 are:

	2010	2011
Transmitting	1561	1682
Non-Transmitting	19	17
Overseas Members	25	31
Complimentary/Associate Branches	87	127
	1695	1857

Headquarters

It is interesting to note that membership figures have increased by 162 since 2010. I would suggest that many of these new members (76 in fact) are due to the free subscription offered to all new amateurs when applying for a call-sign. NZART Council implemented a free membership to all new candidates who applied for their call-sign through the Association in late 2009, which is having quite an impact on our membership.

We now need to be very vigilant that we keep these new amateurs not only interested in the hobby but also financially supporting the Association. At the time of writing this report, there are still approximately 380 members who have yet to renew for 2012, so the above figures will drop dramatically if we cannot encourage them to pay their subscriptions.

As I said last year, I now only post out one branch circular per year. This is done in March so that I can send branch secretaries their membership figures for voting on remits to the AGM. Postage increased quite heavily in 2011 so it will be interesting to see savings if any were achieved in doing so.

Lastly, I undertook the role in July of HQ Info-line Editor with the sudden and sad passing of Jamie Pye ZL2NN. Jamie's involvement in many of the Association affairs has left an incredible void, however as he would have been the first to state, 'the show must go on'. I would appreciate any comments members have on the content they would like to see included in this publication. It is hard to know what should be printed, but at the same time get the information from members to be printed.

Debby Morgan ZL2DL,
Business Manager

Break-In Editor's report 2011

Overall this year we have had only a marginal supply of copy. This has allowed the publication of reasonably balanced and, I hope, interesting *Break-In's* but all too often limited to only 40 pages. Also on the debit side we are still unable to find volunteers to take over compiling the Short Wave Listening and QRP columns.

Advertising from commercial sources has been limited but remained steady overall. Earlier this year the loss of the inside front cover (IFC) advert from Com-Centre was disappointing but fortunately ICOM took up an additional page (IBC & OBC)and from now on we have the IFC dedicated to Kordia. Appeals to members with commercial connections have yet to generate more advertising; even low-key, low-cost "Classifieds" would be welcome. Contrary to some local opinions/suggestions it has not proven possible to obtain adverting from overseas companies and/or organisations like ARRL and RSGB. The number of HAMADs also remains steady, with most of the HAMADS being for "Wanted" items.

A Readership Survey was conducted in the Jan/Feb issue of *Break-In*. Results indicated that a clear majority of members were happy with the overall balance of content but that members were unwilling to pay an increased subscription to allow *Break-In* to be printed in colour. Following comments from the recent readership survey I have made some minor changes to the font type and size to improve the readability of *Break-In*.

The survey also revealed that over 70% of members preferred to receive a printed version of *Break-In* rather than in an electronic (PDF) format. In similar vein the RSGB conducted a readership survey earlier this year and I was intrigued to read in the August issue of *RadCom* "that there is a clear message from our members that they would not want *RadCom* to be published only in electronic format". This parallels our findings but I have no doubt that we will still get a few folk claiming that *Break-In* could save large sums by going all electronic! Similar findings were reported for the WIA's *Amateur Radio*.

A trial introduction of four colour pages was tried in the July/August issue of *Break-In*; but to date no feedback has been forthcoming ! From the editorial aspect this proved to be quite a difficult and time-consuming exercise since it has requires a fair amount of "juggling" to sort out which pages are to be printed in colour. As a consequence I have not made strenuous attempts to include colour pages.

John R L Walker ZL3IB,
Editor

Frequency Management and Technical Advisory Group (FMTAG) 2011 Report

FMTAG has worked steadily throughout 2011 providing advice and guidance on licensing matters, to Council and members, and assisting the Administration Liaison Officer. Terry, ZL4TAE, joined FMTAG in October, bringing his extensive radio engineering and managerial skills to the team. We have answered many technical and licensing queries from both NZART branches and individual members.

Our streamlined procedure for licence applications, introduced in 2009, is working well, with most applications proceeding to the granting of licences in under a month.

The usual work with repeaters and beacons has continued. There are now 296 Amateur repeaters, beacons and links registered on the MED licensing data base. 180 licences were renewed during the year. 27 repeater, beacon and link licence applications were investigated, crafted and certified in accordance with the MED's Radio Licensing Certification Rules (also known as PIB38), during the year, at a saving to NZART members of $11,040 in MED Engineering Certification fees.

Most Branches have now transferred their STSP repeaters to the single All New Zealand Short Term Special Purpose repeater licence, with savings to the Branch of $46 per annum for each individual STSP licence relinquished. Please refer to MED Licence 209732 and to page 7 of March/April 2008 *Break-In*, for the terms and conditions of the STSP licence.

The third version of the MED's Spectrum Management And Registration Technology (SMART 3) licensing system, introduced in early 2009, is still providing surprises. These usually appear following the (approximately) monthly software upgrades.

A new bug appeared in late October 2011, which affected the November renewal of 170 Licences. We devised our own work-around. The MED appreciates our testing of, and reporting on, the performance of the software it uses!

My thanks go to the many NZART members who have assisted FMTAG during 2011. Finally, my thanks also go to Doug, ZL2TAR, John, ZL2HD, and Terry, ZL4TAE, for their valuable support and advice during the year.

David Andrews ZL2SX,
Chairman FMTAG

Awards Manager Report

The total number of awards issued in 2011 is down on the previous year with a total of 67 being issued. Once again the IARU Region 3 had a total of 47 certificates being issued

Other awards issued 9 WAP, (one was a 5 Band WAP) 2 CJC, 1 NZC, 1 WAR making the overall total of 67 awards issued last year.

Alan Chapman ZL3GX NZART, Awards Manager

Break-In Advertising Manager's Report 2011

There has been a decrease in invoiced commercial advertising over the last year and the comparison is as follows:

2008	$8,319.50	excluding GST
2009	$10,001.14	excluding GST
2010	$8,530.75	excluding GST
2011	$5,978.00	excluding GST

The main reason for the large decrease in advertising revenue between 2011 and 2010 is that ComCentre stopped advertising after the March/April issue. There have now been two major advertisers who have withdrawn in the last two years. Icom NZ have made up for part of the gap by placing two full page ads commencing with the May/June issue which is much appreciated. Kordia have a regular full page ad but this space is provided as part of the repeater agreement with them. Note that the 2010 figure includes 3 ads in *Call-Book*. If *Call-Book* had been published in 2011 it is expected that the income would have been $1265 greater.

The above figures do not include a small amount paid either by members who have used more than their 30 free words for Hamads or non-members who have paid for Hamads.

If any members know of a prospective advertiser, please contact me and I will be happy to provide them with costs.

Lorne Douglas ZL2AHB,
Break-In Advertising Manager

Call-Book Editor's Report for 2011

This is the most disappointing report I have ever prepared. *Call-Book* was all but ready to be published apart from the call-sign list by early November. Unfortunately the Ministry of Economic Development's Radio Spectrum Management group were unable to have their new software ready by early November which was the latest that the information would be required to enable *Call-Book* to be printed before the end of 2011.

The new software will enable me to do a direct download of call-sign details as available in SMART and I am looking forward to using it in 2012.

In the meantime, Branch details are kept up to date on the NZART website and the repeater and beacon maps which were updated for *Call-Book* have been placed on our website and continue to be modified as changes are provided to FMTAG or myself.

Lorne Douglas ZL2AHB,
Call-Book Editor

NZART ARX & Examination Coordinator Annual Report 2011

Warren Harris ZL2AJ has been busy this year updating the examination database of questions that is presently in use for new amateurs. Once all amendments have been approved by Radio Spectrum Management, all examination supervisors will be advised.

Again I reiterate what I reported last year, RSM are very keen to see one examination syllabus to save time and work for them and save confusion for candidates. The process for this is slow and tedious, but extremely important to ensure there are no anomalies in the question bank and that all RSM approved Amateur Radio Examiners (ARX's) are happy and conversant with the system once implemented.

The following are examinations results for 2011.

Results are as follows:	2010	2011
	52	70

These figures include only those examinations sat through the NZART system. There are other agencies conducting examinations and issuing call-signs, however we do not know the results from these.

The examination process remains the same, however every successful candidate on submitting an application for a call-sign, has this year has received one years free membership to NZART.

Once again North Shore branch is to be congratulated for their excellent effort of 19 successful passes.

SMART Statistics 2011

	2010	2011
New/Lapsed/Overseas Call-sign applications	77	82
Secondary/Amended Call-sign applications	18	12
Special Event Calls/One letter calls	13	18

Once again I advise that these applications are only those received here at NZART headquarters.

Debby Morgan ZL2DL,
ARX 2086

Monitoring Service Coordinator – Annual Report 2011

Successes:

There have been no real successes during 2011, apart from the inaugural award of the NZART Top Intruder System Observer award, won by ZL2TZE. It is only with the ongoing contributions of regular reporters and through international dialogue with Region 1 and Region 3, which has improved our vigilance within the AR bands. OTHR and CODAR still remain disruptive, within the AR bands, when they occur.Requests for reports can be rather hit and miss, so the use of active WebSDRs and Grabbers along with requests to spot via ZLHAMS, Intruder watch and the MS e-mail systems. Although the collaborative support from other regions has proven to be invaluable at times during the year. We have been in touch with the Station manager of (Tiger) Unwin Station, several times to verify that their systems were not active.

There has been one collaborative success within Region Three, the reporting of a Stereo type radar PMCW system, which for months inundated the CW segment of 40 metres via VK3MV to the ACMA. This action appears to have resulted in the OTHSAR moving just outside the CW segment, but on occasions, I have personally observed it residing within the 40 metre band from 7100 kHz upwards during hours, that most of us are asleep.

Alleged Pirates:

The pirate scene appears to have quietened down during 2011, after a concerted effort by my AR colleagues to communicate regularly about various VK and ZL, ZK pirates on the various DX Clusters. This technique appears to have had a positive effect, in reducing reoccurrences through the year.

We will continue to add entries to DX Clusters to encourage other ARs to participate. It is very much a case of being vigilant and depending on good intelligence through collaboration with other groups.

Complaints:

There has been one complaint about music being played on an Auckland 146.625 Repeater and also on the National System. This complaint is being followed up by Vaughan Henderson with the RSM.

Liaison

Last years liaison within the Pacific region has remained constant through the year, but has also expanded into the HF DX scene (which adds an additional set of ears and eyes, when requested to assist.)

I often add intruder entries into the SK6AW DX Cluster, as this cluster, has a very useful search facility for logging intruders and being able to report on them. Reports have also been provided to Region 1 via their online logging system, which normally ensures a dialogue with Region 1 about particular intruders and types of signals with an explanation how to measure them appropriately.

The Region 3 IARU MS Coordinator Peter Young, VK3MV – has continued to provide collaboration with the Australian Defence Force and ACMA to resolve various OTHR systems. However, with the news that the ACMA are shortly pulling down their own HF Direction Finding capability, leaves a large hole in our ability to carry out direction finding on intruders. Peter is looking for a suitable plot to put up his own HF DF system.

Peter passed on the news about the latest Monitoring Service resolution:. Resolution 11.1 for the Monitoring Service has been released. This means there will be changes with how the Monitoring System coordination. These include:

- Member societies shall report details of the improper use of amateur bands by stations in their own country to their own national administration and take all steps possible to ensure that their administration acts to stop such improper use. Details of cases of established improper use of the amateur bands that cannot be resolved by the member society with its own administration shall be forwarded by the member society to its IARUMS Regional Coordinator.
- Member societies and their National MS Coordinators are encouraged to report details of the improper use of amateur bands by stations in other countries to their own national administration so that their administration may raise the matter with the administration of the station concerned.

The major changes include a single coordinated web site for all Monitoring System coordination, which is likely to be centred on something

like the current Region 1 web site. There will also be a change in format for monthly reports, which will look very similar, if not the same as the monthly reports created by Region 1. A separate copy of the new system, have been passed to NZART Council.

Monthly reports have been received regularly from Bob Knowles, ZL1BAD despite managing to break both hips individually on separate occasions.

Voluntary Observers often contribute reports either via the Google IntruderWatch site or via the ZLDX and ZLHAM reflector sites, with audio samples, where possible.

There is probably sufficient reports and samples available to raise an official complaint to the RSM about 10 metre intruders, many of whom appear to be Chinese, using AM or CB low power stations. Region 1 has been relatively successful in reducing the number of Russian Taxi's recently, but it did take a Russian speaker to liaise with the Taxi Company to obtain sufficient evidence before they formally complained.

Equipment Inventory

The JRC 535 receiver developed a fault, which I originally suspected was due to no front end protection. The JRC 535 receiver was professionally repaired by Richard, ZL1BOK of Com-Centre. They discovered that a faulty switching unit on the RF Oscillator board had developed causing the Phase Lock Loop to unlock, which resulted in no reference oscillator output. I will make a claim of $181.00 for the repair of the JRC 535 receiver from NZART in January 2012, if this is acceptable.

Bob Knowles ZL1BAD has requested that the Hoka decoder, be passed back to him, as he has old DOS based systems, which will enable him to carry out analysis on Russian Military FSK signals he regularly encounters. Ex-VR2BG (Brett) and VU2UR (Arasu) have been most useful identifying languages, sometimes successfully and others, which have beaten them too – usually Chinese dialects.

The Wavecom W-Code software and associated USB key has proven to be invaluable for speeding up the real time analysis of digital signals and in particular OTHR systems. Some of these systems, only come on for a brief periods of time, and have disappeared before one has set up to analyse them on the fly.

Good collaboration has been set up with the owner of the Signals.taurne.de digital (Leif) signal web site, which has been useful for identifying signal types.

I have personally invested in a Winradio WR-G33DDC Professional Software Derived Receiver (SDR), after reviewing the current market place. This equipment has made a major difference, in terms of effectively monitoring the whole of the HF spectrum including analysing patterns within the AR spectrum and the ability to schedule out of hour's recordings (10 Gigabyte on average).

Suggestions for 2012

Prioritise efforts within the primary amateur radio frequencies to select a hit list of intruders per month: i.e. broadcast stations on 40 Metres. Raise suggestion to IARUMS Region 3 Coordinator to raise our success rates and to make best efforts of resources. Not everyone is a night owl, so scheduled spectrum recordings reveal patterns that not everyone observes.

Continue to request assistance via Clubs and via reflector groups to raise the profile of monitoring activities and in particular encourage more reports for direction finding purposes. Direction finding with the clubs HF beam is perfectly feasible with the right techniques and existing equipment.

Encourage DXers to report OTHR and Pirates by example to assist the Monitoring Service and Intruder Watch participants via DX Clusters – SK6AW offers additional start capabilities which include intruder key words i.e. OTHR, RADAR, BC, Pirate, CODAR etc. Use of the ZL6IW callsign (with separate Log book) on National System and also 80 metre net on a weekly basis (XYL permitting).

Comments

For many years, traditional receivers have been the mainstay of good shortwave and Amateur Radio stations and associated equipment. Many of them have had good general coverage. What is revealed through a HF Software Derived Receiver (SDR) is that it is important to monitor, what is going on within the AR spectrums and outside. These systems reveal patterns about persistent intruders; provide a high degree of resolution due to the ability to actually "see" what is going on rather than based on purely listening. This adds another dimensions, the ability to sample, record, provide visual information and pass on to third party solutions for further analysis and potential decode. But this does mean one does have to be aware of HF Broadcast stations i.e. HFCC database or EIBI database regular updates To be able to check the validity of reports, their context is rather like forecasting propagation patterns at certain times of the day and night.

As stated last year, being a good Short Wave Listener is an invaluable skill, but it does take a lot of time to spot patterns and collect and collate observations from other sources.

I will carry on attempting to put together the HF DF articles and techniques for *Break-In* and produce a Radio Club circular to encourage them to contribute. I would rather receive an invalid report, rather than no reports whatsoever. However, I have to ensure that the methods used are practical and they are simple and repeatable with good success rates. Not everyone has a 17 metre mast and SteppIR Yagi in the backyard or room to put up an Adcock-Watson array for HF purposes.

I will also endeavour to put together a presentation, which can be circulated to clubs or via the NZART web site on Intruder Monitoring and techniques or present it myself. Hopefully if the travel restrictions loosen up this year i.e. IBM, then perhaps Wellington and Christchurch may be feasible visits.

John Martin ZL1GWE,
MS Coordinator NZART

NZART Webmaster report

It was with sadness this deputy webmaster heard of Jamie ZL2NN's serious illness, then sadly of his move to the Silent Key Roll of Honour. Among his many duties to our association had been Webmaster for a number of years, and Jamie has developed this into an excellent web page for our association.

Taking over with no notice, and little knowledge of the engine room behind the system has been a bit of a "baptism of fire", however the page has continued to provide reliable service to the amateur community, and published information has been updated at an average rate of 1 – 2 pages per week. The web server accumulates some 4 000 000 hits, with around 250 000 unique visits per year, so it is clear the is a good resource of information for many.

Some good suggestions for changes in layout have been received from users, with a number of relatively minor changes having been implemented, and some larger changes now under development as time allows. This feedback is always appreciated.

The webmaster responsibilities include the management of @nzart.org.nz email aliases, and circulation of the fortnightly Infoline bulletin. While Jamie also held the post of Infoline editor, this responsibility is currently being handled by Debbie as an interim arrangement, and a new permanent Iinfoline editor is being sought.

In conclusion my thanks go to Debbie for her enthusiastic support, and to three amateurs who have assisted my take-up of this role, and continue to provide vital support – Mark ZL1VMF, Jim ZL2IA and Jim ZL2PU.

Alan Wallace ZL1AMW,
Webmaster

Official Broadcast Annual Report 2011

February through December 2011 the NZART Official Broadcast was made at 8pm and 9pm on the last Sunday of the month on 3.9 MHz LSB, the UHF National System and a large number of two metre repeaters. A special Conference Official Broadcast was made live from the Silverstream NZART Conference at 8pm on the Sunday of Queen's Birthday weekend. Throughout the year a team of helpers has ensured that Official Broadcast distribution occurred and has been available on the NZART Web page. To all involved my thanks and appreciation.

I wish to record my sadness at the loss of Jamie Pye ZL2NN our NZART web master on his becoming Silent Key mid-year. Jamie was a great supporter of the Official Broadcast in many ways over many years.

In June this year I shifted QTH from Auckland to Marybank in Nelson. With such a move there was inevitably some temporary transmission arrangements required. My thanks to David ZL2BCA for his assistance in maintaining the monthly Official Broadcast transmissions.

Regular broadcast contributors for 2011 were the NZART President Roy Symon ZL2KH, NZART Business Manager Debby Morgan ZL2DL, Rosemary Boshier ZL1RO for WARO and Stephen McNeill ZL4HG with the NZART Branch News.

Selected items from the USA's Amateur Radio Newsline bulletin were used to give the broadcast an international flavour. My thanks to Bill Pasternak WA6ITF and the Amateur Radio Newsline for the permission to use their material.

Emailed Branch newsletters provide a valuable source of information. Remember, you may e-mail a copy your club's newsletter, or other information directly to the Official Broadcast. E-mail <zl6a@nzart.org.nz> it has never been easier!

Finally thanks to you the listener. If you have any comments or suggestions you wish to make about the Official Broadcast please drop me a line or e-mail <zl6a@nzart.org.nz>

Jim Meachen ZL2BHF

NZART QSL BUREAU: Annual Report 2011

Incoming Mail

DX	Packages/envelopes 163. Cards 35961
ZL	Packages/envelopes 407. Cards 24618

Outgoing Mail

DX	Envelopes 407, Parcel kg (cards 24226)
ZL1 Bureau;	45 kg of QSL cards.
ZL2 Bureau	35 kg of QSL cards.
ZL3 Bureau	15 kg of QSL cards
ZL4 Bureau	14 kg of QSL cards.
ZL7T	5kg of QSL cards. (Privately funded postage)

The NZART QSL Bureau's gross expenditure for this past financial year was $1690.72, an increase of $150.75 on the year ending 2010. The nett cost to the Association was $1222.32 as against $1105.98 for the previous year. Donations of $468.40 ($424.95 – 2010) made up the balance of the running costs of the Bureau for the year under review.

The Association's sincere thanks go to those of its members who, from time to time, saw fit to enclose a donation with their QSL cards. Their generosity has helped to keep down the Association's day to day running expenses.

Year 2011 saw an increase of a little over two and a half per cent in numbers of cards sent out by ZL operators whilst there was an eight per cent increase in the number of incoming cards from overseas amateurs.

During the past year, the NZ Post Office yet again increased the Bureau mailing costs when it saw fit to discontinue its Surface Air Lift service resulting in the 'Economy Mail' postage rate being done away with and full Air Mail postage rates now apply to all overseas postings.

My thanks go to our four Sub-Bureaux managers, namely Ross ZL1BGB, Tony ZL2AGY, Ken ZL4HU and Dave ZL4OZ, who attended to the stuffing of envelopes for all of the 'deserving' during 2011.

B.E. Stewart ZL2RR, Manager

Reflector Moderator Report

I join with the organisation in mourning the passing of my co-moderator, Jamie Pye ZL2NN, who devoted an amazing amount of time and energy to the Association's online presence.

The mailing lists have operated reasonably smoothly over the past year and we have continued to make <callsign@nzart.org.nz> email forwarding available to members. We are investigating options for a new mail and web hosting solution as our current provider is discontinuing support for our current platform, but the transition should be transparent to the members.

Jim Tittsler ZL2IA

NZART Radioscience Education Trust; report for 2011

Once again a rather disappointing year. From the twenty plus Science and Technology Fairs throughout New Zealand; prizes were awarded at only two Fairs. This is similar to last year and a cause of major concern to the Trustees. It is a cause for concern that several judges reported that very few exhibits had an 'electronics" theme and still fewer any sort of relationship to 'radio'. Nevertheless we are grateful to those judges who sent reports and photographs for inclusion in *Break-In*; the Trust needs this publicity!

A highlight for the year was the granting of $7500.00 to the AMSAT-ZL KiwiSAT Microsatellite Project led by Dr Johan Potgieter of the Massey University Albany Campus. This was to fund a study grant for four students to work on the Attitude Determination and Control (ADAC) scientific experiment. The Trustees look forward to assisting future projects of this nature. (See the Sept/Oct issue of *Break-In* for a report on this project.)

The new procedures for sponsorship involving direct liaison between Branches and local Area Science & Technology Fair Coordinators seems to have worked quite well. Under this arrangement Branches are reimbursed by the Trust if and when a prize is awarded. The Trust has also decided to contribute up to $20 to the running costs of the local Fair. However; the problem of getting up-to-date contact information to Fair Coordinators, and sometimes Branch Secretaries, is an on-going problem. It must be stressed that judges must be licenced radio amateurs and should be appointed by the local NZART branch. Two Fair organising committees took upon themselves to "go it alone" without Branch input and this is not acceptable.

There is still an urgent need to promote our activities amongst the science tutors of our secondary schools. Science teachers are those closest to the students and it's to them we should target attention. The NZART web pages now have a Trust section to promote the Trust and assist schools and Branches. The Trust's income for the year 2011 was $1757.23 and our Bank Balance at the End of December was $9757.51.

For the past three years the Trust has also offered "Grants-in-Aid" of up to $250 to support specific projects in schools or organised by NZART Branches and it is most disappointing that so few schools have taken advantage of this offer. Maybe branches could do more to publicise this offer? In Christchurch the Trust has supported several "Buildathon-type"

and "RadioTek"projects. "These have been very successful in bringing a "hands-on" approach to radio and electronics. Details of these excellent programs have been published in earlier issues of *Break-In*.".

The Trustees wish to thank those participating branches of the Association that have taken the time and effort to promote the NZART Radioscience Education Trust. The rewards in helping the young people of New Zealand to a possible future in Radio and Electronics, are well worth the small effort involved.

Trustees: Terry Carrell ZL3QL, Grahame Fraser ZL3SJ
Peter Norden ZL2SJ, John Walker ZL3I-

Administration Liaison Officer's Report for 2011

2011 was again a busy year with a number of different matters requiring submissions to, or discussions with, the Ministry of Economic Development.

130 kHz

The Ministry put out a discussion paper on increasing the allowable power for short range devices in the 9-190 kHz band. NZART put in a submission (see HQ Infoline 31s) stating we had no objection to the proposed change but that this was based on the assumption that LF short range devices will continue to be type approved and will not be modified by the end-user.

500 kHz (or 600 metres)

The Association has also been active on the international scene; providing inputs to the Ministry to establish the New Zealand position for a world wide allocation in the vicinity of 500 kHz and to the IARU – all in preparation for the 2012 World Radiocommunication Conference at which this will be discussed.

Channel 39 – Planning for Digital Television and New Uses

NZART has again been meeting with the Ministry to explore alternative options for ATV transmissions in the UHF band and we will continue working with them to agree an approach for Amateur television.

Amateur Power Limit

Following the success of the HBARC remit to the 2011 Conference, an approach was made to the Ministry to increase the Amateur power limit. The Ministry agreed with our request and, from 30 November 2011, the power limit for most bands rose from 500 watts to 1000 watts peak envelope power. For further information, please see HQ Infoline 30s.

Call-Signs – E, X, Y and Z series

In June, after discussions with NZART, the Ministry agreed to the release of the ZLnE, ZLnX and ZLnY call-sign series to Amateurs. The Ministry retained the ZLnZ series to avoid confusion with the ZLZ numbering series used for their Suppliers' registration system. For further information, please see HQ Infoline 227.

Client Information in SMART

Members frequently express concern about the accuracy of call-sign, name, address and other information held in the SMART. The Ministry has started a process of contacting all those listed in SMART with a request that they update their client information. I have been advised that they have now contacted all those who have an email addresses in SMART and will soon be progressively contacting those who do not have such an address. For further information, see HQ Infoline 243.

Internet Connected Amateur Radio

Late in the year we asked the Ministry if it would be possible to put in place a single nationwide licence for our APRS (Automatic Packet Reporting System) digipeaters. The Ministry declined our request stating that changes to these licensing categories would need to be addressed in the upcoming fees review. For further information, see HQ Infoline.

Thanks. I would like to thank the large number of people who have contributed, formally or informally, to many of the matters discussed above – it would not be possible to carry out my role without their contributions.

Don Wallace ZL2TLL,
Administration Liaison Officer

Local Government Liaison Officer Report 2011

As for 2010, district plan changes and reviews were the main activities in local government liaison.

The 2010 appeal against the decision of Wellington City Council to limit permitted use of lattice masts to the residential building envelope maximum heights of 8 metres and 10 metres (for the outer and inner residential zones respectively) was heard by the Environment Court in December. A decision is awaited.

An appeal was lodged with the Environment Court on the 2011 decision of Tauranga City Council on the NZART and local branches submissions opposing proposed rules in the District Plan review. The appeal is an endeavour to gain higher permitted use supporting structures, both lattice masts and poles, than the 9 metres of the council's decision. One court-assisted mediation meeting was held, chaired by an Environment Court Commissioner, and further such meetings are expected. If the matter cannot be resolved at mediation, a Court hearing will follow.

A formal submission was made to the Rangitikei District Plan Review opposing proposed rules for antennas and supporting structures.

I addressed a well attended meeting of Manawatu Branch on the subject of district plans and the problems they can create, and gave advice which assisted their pre-consultation submission to the Palmerston North city Council. Similar advice was given to Titahi Bay Branch.

Advice was given to a number of individual amateurs who sought assistance in dealing with their local councils.

With low beam antennas, in some situations the recent increased 1 kilowatt power limit cannot be used, since the permitted emission exposure levels are exceeded. This stresses the importance of having antennas at a height where the allowable emission field strengths can be achieved, otherwise the 1 kilowatt power limit cannot be realised. It is incumbent on all branches to oppose restrictive antenna heights.

The cost of failing to secure reasonable rules in relation to antenna supporting structures can be very expensive if a notified resource consent is needed, the cost of which can range from the order of $2000 to $10,000 or so, depending on the local authority, with no certainty of success. These costs can well exceed an individual amateur's investment in his station equipment.

I re-iterate the concluding paragraph from the 2010 report, in which I wrote… 'This report serves as a reminder to actively oppose inappropriate rules, since once a district plan is finalised it becomes the governing document for the next 10 years, and leaves no avenue for recourse…'.

Mike Newman ZL1BNB,
Local Government Liaison Officer

AREC Report 2011-2012

AREC has had another busy year. Christchurch branch had the busiest time with the report on the Earthquake/s already having been published in *Break-In*.

A review of funding for the next three years took place and AREC have been given an increase over the previous budget to enable the distribution of equipment to cover more of the AREC Sections in a shorter time span. Our thanks go the NZ SAR Council for this.

E-text has been used to alert Sections when required and is also utilised to remind Section Leaders of the monthly nets.

AREC Secretary Doug Cooke has overhauled the AREC reporting form and it now includes frequency usage so we can get an idea of the 5 MHz usage. Generally reporting has been better in the last twelve months and we all need to keep it up as with out the information it provides it is difficult to ask for funding.

Former National Director Brian Purdy has re joined the Management team as training officer and is putting together training days for both the North and South Islands.

I would like to thank all who have given their time to assist when required and if you haven't seen action in the last twelve months, keep well trained with your equipment serviceable. You never know when something will happen.

Jeff Sayer ZK6EX,
AREC National Director

CHARTERED ACCOUNTANTS

PARSONS RODDICK & CO

We have audited the financial report on pages 1 to 8. The financial statements comprise the Statement of Financial Position as at 31 December 2011, and the Income and Expenditure for the year then ended, and a summary of significant accounting policies and other explanatory information.

Officers Responsibility for the Financial Statements

The officers are responsible for the preparation and fair presentation of these financial statements in accordance with generally accepted accounting practice in New Zealand and for such internal control as the officers determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibilities

Our responsibility is to express to you an opinion on these financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing (New Zealand). These standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the New Zealand Association of Radio Transmitters Incorporated preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the New Zealand Association of Radio Transmitters Incorporated internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Other than in our capacity as auditor we have no relationship with, or interests in, the New Zealand Association of Radio Transmitters Incorporated.

Unqualified Opinion

In our opinion the financial statements on pages 1 to 8 comply with generally accepted accounting practice in New Zealand, and give a true and fair view of the financial position of the New Zealand Association of Radio Transmitters Incorporated as at 31 December 2011, and of its financial performance for the year then ended.

Parsons Roddick + Co

Parsons Roddick & Co
21st March 2012
UPPER HUTT

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Income and Expenditure for the Year Ended 31 December 2011

2010		Note		2011
	Income			
130,878	Subscriptions	1		118,606
10,695	Interest and Investment Income			10,749
7,740	Donations Received			560
6,453	SMART Processing			6,722
262	Examinations	3		83
671	Publications	2		747
156,699	**Total Income**			**137,467**
	Less Operating Expenses			
61,040	HQ Operating Costs	4	59,080	
1,850	Audit Fee		1,950	
574	Beacon & National System Costs		1,688	
174	Branch Visits		-	
71,849	Break-In and Call Book	5	46,532	
7,879	Conference		9,287	
954	Contests, Grants and Gifts		312	
3,253	Council Expenses		2,575	
-	Election's		2,036	
1,778	IARU Region 3 Contribution		1,414	
(2,210)	Legal Expenses		1,600	
(589)	Repeater Licence Costs		2,607	
-	Membership Promotion		-	
1,000	Officers Expenses not covered elsewhere		(5)	
964	Overseas Travel		-	
1,589	QSL Bureau Costs		1,674	
314	Website		512	
150,420	**Total Expenses**			**131,262**
6,279	**Excess INCOME over Expenditure for the Year ended 31 December 2011**			**6,205**
2,588	Taxation Expense			2,429
$ 3,691	**Excess INCOME over Expenditure transferred to Accumulated Funds**			**$ 3,776**

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Statement of Financial Position as at 31 December 2011

2010		Note	2011
	Members Funds		
233,623	Balance as at 1 January 2011		237,314
3,691	Add movements in reserves	13	3,776
237,314			241,090
4,647	Conference Expense Fund		4,647
1,131	Non Sponsored Awards Fund		1,131
$ 243,092	**Total Members Accumulated Funds as at 31 December 2011**		**$ 246,868**

	These Funds are Represented by :			
	Current Assets			
11,792	Bank of New Zealand - Current Account		32,208	
300,731	Bank of New Zealand - Deposit Accounts	6	271,940	
5,460	Westpac Trust - AREC Imprest Accounts		9,959	
23,847	Westpac Trust - Deposit Account	6	24,649	
99	ANZ Bank - Break-In Imprest Account		216	
5,629	Public Trust - Deposit		5,687	
5,448	Accounts Receivable	7	6,958	
434	Bookshop Stock	9	587	
854	Provision for Tax	8	1,647	
651	Prepayments		3,339	
354,945	**Total Current Assets**			**357,190**
	Less Current Liabilities			
11,522	Accounts Payable		7,676	
31,376	AREC Balance held	10	80,554	
114,596	Subscriptions received in Advance	11	104,413	
157,494	**Total Current Liabilities**			**192,643**
197,451	**Working Capital**			**164,547**
45,641	**Fixed Assets (as per Asset Schedule)**	12		**82,321**
$ 243,092	**Net Assets**			**$ 246,868**

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

ACCOUNTING POLICIES FOR THE YEAR ENDED 31 DECEMBER 2011

1 Financial Reporting
The Association qualifies for certain disclosure exemptions under the New Zealand Institute of Chartered Accountants Framework for Differential Reporting because it is not publicly accountable and size (as defined in the Framework). The New Zealand Association of Radio Transmitters Inc has taken advantage of all financial reporting exemptions.

2 Measurement Base
The Accounting principles recognised as appropriate for the measurement and reporting of earnings and financial position on a historical cost basis have been followed by the Association.

3 GST Basis
These financial statements have been prepared on a GST exclusive basis.

4 Changes in Accounting Policy
There have been no changes in accounting policies. All policies have been applied on bases consistent with those used in previous years.

DISCLAIMER
These pages (19-26) arrived too late for normal typesetting.

Editor

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc.

Asset and Depreciation Schedule as at 31 December 2011

Asset	Cost Balance 1.01.2011	Cost Additions / Disposals	Cost Balance 31.12.2011	Depn Rate	Depreciation Provision Balance 1.01.2011	Depn Charge	Disposal	Depreciation Provision Balance 31.12.2011	Book Value Balance 1.01.2011	Book Value Balance 31.12.2011
Head Quarters										
Desk & Chair	364		364	10% CP	363	-		363	1	1
Antenna - DP-CP6	622		622	10% CP	517	62		579	105	43
Stacker Chairs	240		240		239			239	1	1
Meeting Table	130		130		129			129	1	1
Pentium 4 Computer	2,160		2,160	20% CP	2,159			2,159	1	1
Dell Pentium Comms PC + UPS's (2)	465	- 465	-	20% CP	457	8	465	-	8	-
Compaq Presario Notebook Computer	1,800		1,800	20% CP	1,590	209		1,799	210	1
Brother Inkjet Printer	120		120		119			119	1	1
Cnet Wireless Router	100		100		99			99	1	1
AMD Athlon 3.0Ghz PC	-	542	542	20% CP	-	82		82	-	460
Computer Software - Membership Database	4,445		4,445	33% CP	4,444			4,444	1	1
Leasehold Improvements	1,212		1,212	10% CP	787	121		908	425	304
Security Alarm	738		738	10% CP	479	74		553	259	185
Binding Machine	329		329	10% CP	214	33		247	115	82
Total HQ Assets	**12,725**	**77**	**12,802**		**11,596**	**589**	**465**	**11,720**	**1,129**	**1,082**
ICOM ICF 7000 Radios *	38,896		38,896	17.5% CP	10,536	6,807		17,343	28,360	21,553
ICOM AH4 Tuner	465		465	17.5% CP	68	81		149	397	316
ICOM VHF Handheld Radios	4,470		4,470	17.5% CP	588	782		1,370	3,882	3,100
ICOM VHF Handheld Radios	4,480		4,480	17.5% CP	524	784		1,308	3,956	3,172
ICOM Power Supply	245		245	17.5% CP	29	43		72	216	173
ICOM Tuners & Handhelds	7,396		7,396	17.5% CP	757	1,294		2,051	6,639	5,345
ICOM VHF Mobile & P'Supply	1,164		1,164	17.5% CP	102	204		306	1,062	858
ICF-7000	-	2,393	2,393	17.5% CP	-	419		419	-	1,974
ICF-7000 x 2	-	8,184	8,184	17.5% CP	-	836		836	-	7,348
ICF-7000	-	3,543	3,543	17.5% CP	-	465		465	-	3,078
ICF-7000	-	4,201	4,201	17.5% CP	-	245		245	-	3,956
IC-F3023 x 2	-	2,944	2,944	17.5% CP	-	128		128	-	2,816
IC-F3023S x 3	-	1,752	1,752	17.5% CP	-	282		282	-	1,470
IC-F3023T x 3	-	2,733	2,733	17.5% CP	-	438		438	-	2,295
IC-F3023T x 6	-	3,954	3,954	17.5% CP	-	516		516	-	3,438
IC-F3023T x 12	-	8,100	8,100	17.5% CP	-	948		948	-	7,152
IC-F3023T x 6	-	4,860	4,860	17.5% CP	-	210		210	-	4,650
IC-F5063	-	1,776	1,776	17.5% CP	-	233		233	-	1,543
Sec-1223 x 2	-	558	558	17.5% CP	-	90		90	-	468
Tait TP8115A x 6	-	6,630	6,630	17.5% CP	-	96		96	-	6,534
Total AREC Assets	**57,116**	**51,628**	**108,744**		**12,604**	**14,901**	**-**	**27,505**	**44,512**	**81,239**
Total Assets	**69,841**	**51,705**	**$ 121,546**		**$ 24,200**	**$ 15,490**	**$ 465**	**$ 39,225**	**$ 45,641**	**$ 82,321**

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Financial Notes for the Year Ended 31 December 2011

Note

1 Subscriptions

2010		2011
142,250	Gross Subscription Received	136,470
(11,372)	Less rebates taken	(17,863)
$130,878	**Net Income from Subscriptions**	**$ 118,606**

2 Publications

2010			2011
1,978	Total Sales		1,016
1,585	Stock on Hand 1 January 2011	434	
157	Add Purchases	422	
1,741		856	
434	Less Stock on hand - 31 December 2011	587	
1,307	Cost of Sales		269
$ 671	**Excess Income over Expenditure**		**$ 747**

3 Examinations

2010		2011
262	Income	83
-	Less Costs Incurred	-
$ 262	**Net Income from Examinations**	**$ 83**

4 Head Quarters Operating Costs

2010		2011
192	ACC Levy	-
1,493	Bank Charges	1,175
-	Business Managers Expenses	-
-	Business Management Committee Expenses	-
-	Computer Repairs & Maintenance	120
-	Computer Software Support	143
745	Depreciation	590
436	General Expenses	428
2,586	Insurance	2,776
629	Internet & Email	767
456	Office Expenses	152
4,219	Photocopying	3,567
3,535	Postages & Couriers	1,320
1,966	Printing & Stationery	1,544
8,022	Rent	8,092
-	Repairs & Maintenance	-
35,106	Salaries	36,681
299	Security	412
1,357	Telephone & Fax	1,313
$ 61,040		**$ 59,080**

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Financial Notes for the Year Ended 31 December 2011

Note

5 Break-In and Call Book

2010	Expenses	2011
6,295	Editorial Fees and Expenses	4,924
49,943	Typesetting, Printing and Distribution	49,276
21,809	Callbook	-
78,047		**54,200**
	Less Recoveries	
6,198	Advertising & Sales	7,668
$ 71,849	**Net Cost of Providing Break-In and Call Book**	**$ 46,532**

6 Bank Deposits

	Term	Matures	Interest Rate
BNZ - Achiever Savings Account	On Call		0.50%
BNZ - Deposit Account - 3009	149 days	20-Mar-12	3.50%
BNZ - Deposit Account - 3011	90 days	20-Mar-12	3.50%
BNZ - Deposit Account - 3012	364 days	5-May-12	4.00%
BNZ - Deposit Account - 3015	180 days	29-Feb-12	4.30%
BNZ - Deposit Account - 3017	90 days	24-Mar-12	3.50%
Westpac Trust - Deposit No. 1001	179 days	20-Feb-12	4.25%

7 Accounts Receivable

The Balance of the Accounts Receivable is considered to be totally collectable.

There is no Provision for Doubtful Debts

8 Provision for Taxation

Taxation was provided on Interest and Dividend Income.

2010		2011
8,625	Income Assessable for Taxation	**8,674**
2,588	Taxation at $0.28	2,429
-	Less Taxation overprovided in Previous Years	
2,588	Tax Expense	**2,429**
(3,441)	Less Resident withholding Tax Already Deducted	(3,221)
	Add Provision for Previous Year	(854)
$ (854)	Provision for Taxation at 31 December 2011 (- Refund)	**$ (1,647)**

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Financial Notes for the Year Ended 31 December 2011

Note

9 Bookshop Stock

Stock on hand as at 31 December 2011 was valued at cost.

10 AREC

2010			2011
18,208	**Balance as at 1 January 2011**		31,376
10,000	add Police Grant		-
19,500	NZART AREC Emergency Funds Trust		70,000
	Sales (Jerkins & Manuals)		1,126
47,708	**Total Resources**		**102,502**
	Less AREC Expenses		
650	Administration	650	
-	Conference	1,829	
8,101	Depreciation	14,901	
1,601	Equipment Subsidies	1,739	
1,867	Insurance Subsidies	541	
1,528	Other Costs	651	
-	Printing & Stationery		
2,510	Training Costs	1,250	
-	Travel	387	
76	Vehicle Registration Subsidies		
16,332			**21,948**
$ 31,376	**Balance as at 31 December 2011**		**$ 80,554**

11 Subscriptions in Advance

1429 of the 1861 members had paid their subscriptions for 2012 prior to 31 December 2011

The amount of Subscriptions in Advance is made up as follows :

2010		2011
123,852	Gross Subscription for the **2012** Financial Year	97,529
(17,803)	Less rebate	-
$ 106,049		**97,529**
$ 8,547	Members Credit Balances as at 31 Dec 2011	**$ 6,884**
$ 112,895	**Total Subscriptions received in advance**	**$ 104,413**

NB. These figures are exclusive of GST.

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Financial Notes for the Year Ended 31 December 2011

Note

12 Fixed Assets and Depreciation

The Inland Revenue Department now allows for the purchase of assets with a value of less than $500.00 to be expensed in the year of purchase.The Association has taken advantage of this concession but reduces the value of the asset to $1.00 while that asset is utilised within the Association.

Depreciation has been charges at the rate approved by The Inland Revenue Department for Taxation purposes. The straight line method based on the assessed remaining economic life of all the items estimated at:

Printers	10 years
Office Chairs	10 years
Brother Printer	10 years
Fascimile	5 years
Computer Hardware	5 years
Computer Software	3 years
Leasehold Improvements	10 years
Radios (AREC)	5.7 years

See schedule of Assets and Depreciation for specific details.

13 Movement in Members Funds

2010		2011
233,624	**Balance as at 1 January 2011**	237,794
3,691	Add Excess Income over Expenditure	3,776
237,315	**Total Resources**	**241,570**
(478)	Less Allocated to Specific Funds (Non Sponsored Awards)	-
$ 236,837	**Balance as at 31 December 2011**	**$ 241,570**

MEMO to *Break-In* contributors

CDs:

Nowadays many contributors are sending me graphics and photos, etc on CD and this is much appreciated. At present the cost of a CD is less than the postage costs so, unless requested otherwise, they will not be returned. Please let me know asap if I still have a CD or photo that you would like returned and I will action. Thanks, *John ZL3IB Editor*

NZART CONFERENCE 2012 BRANCH 26

Tahuna Beach Conference Centre, Nelson
Queen's Birthday weekend (1-4 June 2012)

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Remits

Remit 1 Transmitting ***Hawkes Bay Amateur Radio Club Branch 13***

That NZART dissolve the 4 regions for electing councillors and establish 9 electorates, with one councillor to be elected from each electorate.

Explanation:

This would create a new voting system. New Zealand would thus be divided into nine voting electorates. Each electorate would seek nominations for council, with one councillor being elected to represent each electorate. Some of the advantages of this system over the existing system are as follows. Councillors would know without doubt which branches they are responsible for representing. Members would, without doubt, know which councillor represents them, and who to go to for help. Nominations would be encouraged, due to councillors having a sense of pride in standing for their electorate. Branches within an electorate would also be encouraged to make sure someone stands for them. Regions would be ensured representation. See attached proposed electorate makeup.

Remit 2 Transmitting ***Hawkes Bay Amateur Radio Club Branch 13***

Subject to Remit 1, that Council adjust the definition of a quorum in the Constitution to read that the president and 5 councillors, or 5 councillors are required to make up a quorum.

Explanation

This is the constitutional tidy up should Remit 1 pass.

Remit 3 Transmitting ***Hawkes Bay Amateur Radio Club Branch 13***

That FMTAG be instructed to alter policy for verifying licences engineered external to NZART. The alteration is that FMTAG confirms that the externally engineered licence conforms to NZART band plan and frequency reuse policy, and authorises the licence if it passes this test. If it fails this test it is referred to NZART Council.

Explanation:

Fixed station licences engineered external to NZART's FMTAG process, as is currently allowed, need to be presented to FMTAG for approval. This process currently sends the new licence to NZART members for consultation. It also checks the licence for band plan and frequency reuse compliance. The intent of having licences in amateur bands being sent to FMTAG was for bandplan and frequency reuse compliance. There is no need to have an externally engineered licence go for publication, as the external engineer is guaranteeing the interference protection to both the new licence and other services. This check should be thus removed, allowing externally engineered licences a speedy processing time.

Remit 4 Non-Transmitting ***Hawkes Bay Amateur Radio Club Branch 13***

That NZART Council investigates an associate membership status. Such Members would not receive Break-In or Call-Book, and would have no voting rights for elections or remits, but may receive other benefits of NZART subject to council approval.

Explanation:

This is a revenue gathering option for NZART, to help recoup some costs for IARU, and other functions of NZART, that the whole amateur community enjoy.

Remit 5 Transmitting ***Christchurch Branch 05***

End routine packet forwarding on the National System.

Explanation:

To allow 24 hour voice use of the national system. There are so few BBS left it would make more sense to make the system available 24 hours a day to voice and the remaining few BBS can forward over the internet for their backbone and use RF for the last 50KM as the APRS network does.

The packet forwarding can key up the national system for hours placing a heavy drain on a repeater systems running on batteries as happened in Christchurch during the earthquakes; by the time the packet was stopped the batteries were almost flat and we had to turn off the National System. Doing this is counter to the idea of the National System. During the next disaster we may need the National System and the disaster could easily happen in the middle of the night.

Council Comment:

At the Hastings Conference AGM in 2009, a similar remit was put and subsequently withdrawn by the Branch during the AGM as NZART has no authority over the traffic on the National System.

Remit 6 Transmitting ***Christchurch Branch 05***

NZART to work with RSM to either keep our channel 39 ATV allocation, or provide other regional UHF allocations between (520MHz - 880MHZ) to allow hams to experiment with digital TV transmission (DVB- T).

Explanation:

We currently have a national Channel 39 allocation which is outside the normal ham frequency range this would ideally be kept to allow experimentation with the new terrestrial digital network (DVB- T). This would allow the general public and fellow hams to receive transmissions without a special antenna or additional receiver. The Channel 39 allocation, was also in part, an exchange when RSM required hams to relinquish access to part of the original 70cm band we lost 10MHz (the offer of Channel 39 was in recognition that the remaining 10MHz of 70cm was not enough for an ATV repeater input and output pair – hence the output moved to CH39 which was also publicly viewable).

Council Comment:

This matter is already Council Policy. Our ALO and FMTAG are already actively working with the MED with the aim of gaining an ATV allocation in the new digital TV spectrum.

Remit 7 Transmitting ***Christchurch Branch 05***

That NZART work with RSM and Defence to allow the general amateur population access to the 5MHz spectrum; to either allocate another spot frequency or allocate one of the existing AREC ones to general amateur use.

Explanation:

Currently AREC has access to two spot frequencies; these were allocated by Defence with some special conditions. It would be good if the general amateur population had access to one of these spot frequencies or another spot frequency. This would allow all NZ hams to experiment with 60m band.

The rules agreed to by NZART for use of the two 5MHz channels also contain a statement to the effect that NZART is committed to working with RSM to gain general amateur access to spectrum in the 5MHz. (See paragraph 5, <http://www.nzart.org.nzlcouncil/policies/2009-access-to-5-MHz>)

Council Comment:

The matter of an amateur band at 5MHz is already Council Policy and is being actively pursued.

NZART CONFERENCE 2012

IN HAMTASTIC NELSON - BIRTHPLACE OF ERNEST RUTHERFORD

Queen's Birthday Weekend (1 June to 4 June 2012)
In Hamtastic Nelson

The Nelson Amateur Radio Club (Branch 26) invites NZART members and their partners to join us for what promises to be an exciting weekend in the Amateur Radio Calendar. The venue is the Tahuna Function Centre which is located at the Tahuna Beach Holiday Park, Beach Road, Tahuna, Nelson. This is 6km from the city centre, with magnificent scenery, beach at your door step, central heating for your comfort, plenty of onsite accommodation, parking and antenna space. The last time Nelson held the conference was in 2002, and we are looking forward to meeting and hosting old and new friends again this year. We have great boutiques, art galleries, restaurants, cafes and shopping and the Nelson hospitality is Hamtastic.

Registration

Registrations will take place from 5pm until 10pm on Friday evening 1st June, at the Tahuna Function Centre. If you would like to come along and register Friday evening please do, the bar will be open and what a great chance to catch up with old friends and maybe new ones. If you miss Friday night, the registration desk will be open from 8am Saturday morning as well.

You will have the registration form in this issue of *Break-In*. One registration form per person please and there is ***NO internet registration***. Please send your registration form along with a cheque to the address on the bottom of the form. Remember the cut off date for registrations is the 20th May and any registrations after that date will only be accepted if you include the late registration fee of $40.00.

Entertainment

You will be glad to hear there is no loud live music this year. Our entertainment is far more interactive. There will be background music only and after the guest speaker has finished this will be playing quietly. This is the time to catch up with your old mates and maybe make some new ones. By doing this we have managed to keep your registration down under the two hundred dollar mark and hopefully you can enjoy an evening of relaxing and socialising. If this upsets you sorry, but most of the older generation and some of the younger ones also, do not get chance to spend time chatting with old, and new mates. Maybe this year they can.

Provisional Programme Saturday

The Annual General Meeting on Saturday will be opened by our local Mayor Aldo Miccio, and then we will have an official conference photo which can be ordered from the conference. After the AGM has finished we will be having Sharon Dawson from Icom giving us an update on Icom and some of the products they sell. This will be followed by the AREC AGM. We will have pre-dinner drinks starting at 6pm followed by a buffet dinner. Roger Lusby "The Optimist" of Nelson will be our guest dinner speaker on Saturday evening. He will keep you entertained, giving you a few laughs and a few thoughts.

Sunday

Sunday's programme will include AGMs for WARO, OTC, SPAM & AMSAT-ZL, followed by forums on Home Brew gear, Ardunio, QRP, Microwave, Repeater Linking System, ZL5KB Antarctic trip, Radio Tek and many more; you will find these in your programme timetable.

The Radio Tek talk that will be taking place after afternoon tea will be giving you the opportunity to build a radio. This will be an extra cost of $15.00 or $30.00 depending on what type of radio you want to build. This fee is ***not included*** in your registration fee. It is payable on the day to Rory ZL3HB. Spaces are limited to 10 people to build radios, although others are still welcome to watch. At registration you can put your name on the list if you are interested in building.

The day finishes with an evening meal, some entertainment, and ZL2BHF Conference Quiz with a twist. All raffles will be drawn at this evening function. We hope that you will have some fun and laughs tonight.

Alternative Programme

Saturday morning the bus will leave the venue at 10.00am to take you into Nelson city to visit our famous Saturday market, shopping centre, Cathedral, or just to have free time to check out the great shops we have here in Nelson. We will be returning to venue at 12.00pm for lunch. Departing again at 12.45pm to visit some more great places including potteries, crafts, and visiting one of Nelson's historic houses for afternoon tea and more. The bus will return late afternoon, to get ready for buffet dinner.

Sunday morning the bus will be leaving the venue at 9.45am to head to our fabulous and famous WOW (World of Wearable Art) Centre. This is very worthwhile visit whilst in Nelson, you will see some the great world of wearable arts fashions and for the guys a unique car collection. Back to the venue for lunch. The bus departs again at 12.45pm heading out to the Mapua Wharf where the crafts and retail shops are abundant. A great place called Snookies will open your eyes to all you can do with wood. Tessa Mae's with Attitude, well there's always something there for you. Afternoon tea will be alongside the beach, then head off to the Settler's Cottage, Kim's miniature dolls house and back to Eye Bright and Prenzels. You are bound to get a bit tipsy here! The bus will be returning back to the venue late afternoon.

This programme is subject to change.

Accommodation

A wide range of accommodation is available on-site at the Tahuna Beach Holiday Park. Book by phoning free on 0800 500-501. Alternative motels are Driftwood Motels, Arrow Motels, Kingsland Motels, Bella Vista, Arcadia Motels and Ascot Lodge Motels. These motels are all close to the venue. All accommodation bookings are to be made by yourself. We will not be doing any accommodation bookings for conference attendees and we suggest you book early to avoid disappointment.

Travel by Air

To get to the conference venue from the airport, it will take you about 5 minutes in a taxi or a shuttle bus.

Talk-in station

This will be up and running the Friday operating from 1pm until 9pm on 147.025 MHz. The conference call-sign will be ZL2ARG. Please use this call-sign when wanting conference information or directions to the venue.

Our local repeaters are as follows, **147.025**, 146.800, 147.200, 147.375, (linked to Blenheim). You will be able to make contact with locals if you need any assistance. These channels are always monitored by many of the locals and I am sure they will come back to you, however **147.025** is the main local around town channel.

Radio Shack

There will a fully operational radio shack set up for the duration of the conference, offering HF, VHF and UHF National System. There maybe even a Morse key available! This station will not be operating during the AGM.

Questions

Should you have any questions relating to the conference please feel free to email me (Topsy) Conference Secretary on <scott@tasman.net> with your query and I will try to help.

The Nelson Amateur Radio Club Branch 26 is looking forward to seeing you all here in Nelson, in our 80th year. We hope that you will enjoy the stay and the conference we have organised for you.

Take care, travel safe and we will see you soon in Hamtastic Nelson.

Topsy, ZL2LS

JUNE 1ST - 4TH 2012, QUEENS BIRTHDAY WEEKEND

NZART CONFERENCE 2012

IN HAMTASTIC NELSON - BIRTHPLACE OF ERNEST RUTHERFORD

Please, one person only per registration form:

Name: .....
(If you have a nickname or preferred name, please note it here too)

Address: .....
.....
.....

Special dietary requirements: .....
.....
.....
.....
.....

Phone, cell: (.....) ..... Phone, home: (.....) .....

E-mail: ..... Call-sign: .....
(Or XYL / OM)

Entire Weekend (please select only one)			Tick
Full Amateur program	includes all refreshments lunches and dinners	$195	
Full Alternative program	includes all refreshments lunches and dinners	$195	

OR

Saturday			Tick
AGM only	does not include refreshments or meals	$0	
Amateur program	with lunch & refreshments but without dinner	$50	
Alternative program	with lunch & refreshments but without dinner	$50	
Dinner		$50	

Sunday			Tick
Amateur program	with lunch & refreshments but without dinner	$50	
Alternative program	with lunch & refreshments but without dinner	$50	
Dinner		$50	

Total

Please note: Registrations close on Sunday 20th May 2012

ANY REGISTRATIONS RECEIVED AFTER THIS DATE WILL NOT BE PROCESSED,
unless an additional $40 is added to the total above, to cover late-registration arrangements

Note: due to venue and fire-safety constraints, there is also an upper limit on the total number of registrations that can be accepted

Please make your cheque payable to 'Branch 26 NZART Conference 2012' and post with your registration form(s) to PO Box 1820, Nelson 7040

NZART VHF-SHF Records – Rules & Guideline Changes

From Simon Lewis ZL4PLM. NZART VHF-SHF Records Officer

Accurate and aligned VHF-SHF records are an important part of operating in the VHF and up spectrum to many amateurs. The challenge to push the distance boundaries or activate a new band is a key area of their operating and construction activities.

VHF and up records also encourage the investigation and development of VHF and up transmission methods and research into propagation modes as can be seen in the recent developments in the Earth-Moon-Earth (EME) arena, with the growth of WSJT digital modes becoming available allowing a stream of smaller low power stations access to EME than has ever been available before.

VHF and up records need to be constantly updated to meet the challenges that the modern VHF-SHF operator can find and the operating environment they are in. In major areas of VHF-SHF activity such as NA and EU this is important, but in small low density VHF-SHF populations such as New Zealand this is critical to ensuring that development in the VHF through microwave ranges continues and is supported.

To aid this development a set of changes has recently been approved by NZART Council based on the proposal submitted by the records keeper and feedback requested from individual VHF-SHF operation announced in Infoline 232 published 19 June 2011. The aim of these changes is to bring record keeping inline with other IARU regions, to clarify some areas which have been cause for claims discussions in the past and ensure that the records rules and guidelines meet with modern operating practises and procedures. The changes will also mean records tables correctly differentiate between propagation modes versus transmission modes. I also hope these changes will speed up the process of International verification of records and ensure speedier validation of International record submissions.

As the new VHF-SHF Records Officer I would also like to announce that future successful record holders will receive an attractive certificate recording their achievements signed by the NZART president.

An update will be applied to the VHF-SHF Records tables and documentation on the NZART webpages shortly reflecting these changes.

Simon Lewis
NZART VHF-SHF Records Officer

NZART VHF-SHF Records – Rules & Guidelines

General Rules:

The following rules should be considered when submitting an application:

1. Any distance record claimed must either exceed any previously recognised New Zealand distance record or be the first record claimed for that band or mode by a significant distance.
   No minimum distance increase on a previous record is defined but an application should be considered to be a "reasonable extension" on the previous record and in the spirit of record attempts. Final discretion on a submission is the decision of the NZART VHF-SHF Records Officer.
2. Contacts may be made with DXCC entities outside of New Zealand for record attempts. NZ record tables are split into two categories; Internal NZ Distance Records and Overseas Distance Records. However, it is considered that as long as one of the participating stations holds a NZ amateur transmitting licence and is located on sovereign territory, then it is not of any concern that the other end of the path maybe in another DXCC entity and in fact is positively encouraged in the best spirit of extending distances.
3. Participants involved in the record attempt must operate within the constraints of the Radio Regulations for their local country that applied at that time.
4. The NZART VHF-UHF Records Officer is the final approving authority for applications.

These guidelines and notes are to assist you with to claiming a distance record:

- Claimants must consider the following guidelines and notes when attempting a record setting contact. These details are based on internationally recognised rules and best-practice procedures.
- Individual claimants must be aware that personal information provided by them when claiming a record is being collected for the purpose of retention, on-going communication and disclosure for the management of record claims. Information provided may be published in records, journals and in media releases of by NZART.

Evidence Required

When claiming a distance record the applicant(s) must supply evidence of that contact event including statements giving each of the following:

- State that the operators involved in the contact were operating within the constraints of their licence conditions that applied at that time.
- That both stations were attended and operated by licensed operators and that no automated response systems such as robots, satellites, repeaters, packet stations or Internet links such as IRLP etc were used.
- That both stations remained stationary in the same locations during the exchange of the required information and completed the valid contact within a reasonable period i.e over a number of hours.
- That a valid contact has taken place and that all required information details have been exchanged.
- A declaration that the claim as has been made in accordance with rules above.

Definition: Valid Contact

A valid contact is a single-band two-way station-to-station contact that includes the exchange of the required information via the frequency band and mode stated.

Talkback on an alternative band and/or Internet liaison through the use of sites such as VKLogger/ON4KST Chat is permitted, however QSO information that would allow the contact to be validated should only be passed over the band claimed for.

Applicants using Internet chat/loggers should be pay particular attention not to give away contact information in their liaison chat such as pasting of WSJT decodes.

Definition: Required Information

Both stations exchange and confirm back to the other station:

- The call-sign of operator or operating station,
- Unique information such as a signal report

Notes on Station Operation

- Audio visual/multimedia recordings are encouraged but not mandatory for an application to be made. Video and still photographs not only help to document your record attempt but also serve as a useful historical record of technical achievement.
- A witness account of your contact may be entered with your application for verification but your witness may not also claim the record contact.
- QSL cards exchanged between the stations are not required but submission of such material will help the review process and give both stations a personal record of the contact. Electronic QSL methods such as LOTW, EQSL are acceptable.
- Operation from a commercial sites such as a commercial telecoms installation using equipment/antennas deemed not to be readily available to the average amateur while important for activity reasons, will not

be accepted for records attempts as they are deemed to have an unfair advantage.

Notes on Distance Claim & Distance Verification

- All distances will be computed using a certified ellipsoidal program having the values for the earth's radius of 6378.140 km at the equator and 6356.755 km at the poles.
- For inter-NZ contacts NZ reference map coordinates should be used wherever possible to report your exact location, e.g. NZGD2000, TOPO50, Infomap 260 series. GPS readings for positions may also be provided as supporting documentation to map coordinates, and should use the NZ Geodetic Datum 1949 (NZGD49).
- For contacts outside of NZ territories the WGS84 datum should be used or, if in any doubt as to what format to use.
- The Records Coordinator may apply a margin of error when computing distances. This margin is at the discretion of the Records Coordinator and may vary based on the technique used and accuracy applied in determining the station(s) exact position(s) by the claimant. Records claimed may not succeed if the increase in distance from the previously recognized record falls within this margin.
- Claimants are encouraged to attempt records that are a significant increase on those claimed previously. Claimants should avoid claiming records for "One step Backward" record attempts.

NZ Records Format

Records are recorded in the following format:

1. Band and Propagation Mode
2. Table 1 – Internal NZ Distance Records
   Table 2 – Overseas Distance Records
3. The following propagation modes are included as recognised VHF-SHF propagation modes:
   F2 (F2)
   Trans Equatorial Propagation (TEP)
   Tropospheric Ducting (TD)
   Troposcatter (TS)
   Ionoscatter (IS)
   Field Aligned Irregularity (FAI)
   Aircraft Scatter (AS)
   Meteor Scatter (MS)
   Rainscatter (RS)
   Sporadic E (SpE)
   Aurora (AU)
   Auroral E (AuE)
   Moonbounce (EME)
4. For EME and Meteor Scatter modes the following are the recognised transmission mode categories for records:
   Digital and Non-digital.

   Digital QSO's include QSO's using PC generated modulation methods for Meteor Scatter and EME contacts.

   Non digital QSO's include any SSB, FM, CW or MCW type of modulation that is received and / or, decoded by the human ear i.e. Unassisted.

   EME/MS band entries will contain one digital and one non digital entry.

Publication of Records

1. Successful record applications will be confirmed to the individual and a full updated table and rules publication be made regularly in *Break-In* and on the VHF/SHF records section NZART website.
2. Any further feedback submitted to the records keeper and / or council, will be evaluated against the criteria already in use.
3. Regular updates to records rules and guidelines will be made as / when changes in technology or science occur.

Simon Lewis NZART
VHF-SHF Records Keeper

Letters To The Editor

All Letters to the Editor must be signed and include the author's full name, call-sign, (if applicable) and address. Opinions expressed here are those of the author and do not necessarily reflect official NZART policy.

Letters to the Editor: guidelines to contributors

Letters to the Editor should be concerned with Amateur Radio and normally not exceed 400 words. Break-In follow the guidelines given on page 4-3 of the 2002-2003 Call-book "Standards of language, and topics best avoided". Accordingly sex, race, religion and politics are not acceptable subject matter.

VHF/UHF records

Sir

The publication of Simon Lewis's proposed distance records rules this month brings a few issues to the surface. Your feedback is sought as to whether you agree with Simon ZL4PLM's proposal or not or any amendments you feel are necessary.

1. Notes on distance claim and distance verification

The proposed use of New Zealand Grid co-ordinates is out of date as LINZ switched to the new Topo50 and 250 maps series about 5 years ago.

(In my view, all locations should be based on GPS Latitude and Longitude based on WGS84 datum (or NZGD2000, essentially the same thing) as being the only fair way to allow an accurate distance measurement without the possibility of distortions being introduced by using differing datums.

A Grid locator could conceivably be used if no other location record has been provided by either/both participants but this makes the distance measurement unreliable.

Allied to this is what information is to be stored in the Official Records Table? Should database show the participant's locations in the same manner (ie Lat/Long) or just their Grid Locators? I personally think the GPS locations should be the primary locations in the Official Record Table. Grid locators could be included but only on a secondary basis.

2. Notes on station operation

The use of Commercial Sites opens up a can of worms as what defines a commercial site.

Many amateurs are using surplus equipment acquired from Airways, Broadcasting or Telecos and then there are aerial arrays which amateurs may have access to from time to time. The key words are 'readily available' as some such installations may be readily available to a trusted employee or other persons from time to time.

3. NZ Records format

Simon's proposal is to list the Contacts in the Records Table in terms of Band and then propagation mode.

It seems to me that on many bands the propagation mode is often uncertain. For example, 6 metre band trans-Tasman tropo is widely held to be impossible but it seems to have happened elsewhere over other paths of similar distances. In my view, the propagation mode is just a guess and is hardly grounds for being the primary listing as to what happened.

Surely the key issue is Transmission mode? To me these seem to be, CW, SSB, and Digi Modes eg JT65, PSK31, FSK441 and many others though when you think about it, some of these were invented to allow contacts via Meteor Scatter so maybe this one should slip through. MS really is different. Then there are EME contacts for which all the above modes could succeed though currently most such activity uses JT65.

As for a set of having separate record categories for say Ionoscatter, Sporadic E, Aurora, Auroral E, and Tropo, well I hardly know where to start. As I said earlier, many propagation modes are just a guess. Maybe there needs to be an 'Other' category in light of the recently published case of APRS signals copied in Thailand from USA on 2 metres! Just how did that happen?

If a real contact occurred, which category would such a contact be listed in the Records Table? I would just claim the record, to hell with how it happened. And if this is the case why try and "define" the propagation mode.

What are your thoughts?

- Maidenhead Grid square or Lat / Long?
- Or NZ Grid (NZGD49) or Lat / Long (WGS84)?
- Consider a distance record if a Kordia Band 1 TV aerial was used for a 6 metre contact?

continued on page 32

continued from page 31

- How about a 'commercial' 25 metre satellite dish for a spectacular Microwave contact?
- Or a converted TV or other high powered transmitter for a Record claim; even if it fitted inside the prevailing Amateur regs?

The Records Table; should it list Propagation modes as separate record categories ie Sporadic E Tropo or Auroral E, or should the records categories be listed according to the transmission mode? Then what do you do about PSK31 or JT65 (non EME) contacts, or should there just be a terrestrial Digi Modes category?

Terry Thomas ZL4TAE

50 ohm coax

Sir

There is a technical reason why a characteristic impedance, *Zc*, of about 50 ohms is preferred for coaxial cables; it is simply because the loss is smaller. The currents flow on the outer surface of the central and inner surface of the outer conductor and are restricted by the skin effect to a thin layer. The effective area of the cross section of the central conductor is small and its resistance is greater than that of the outer and so more important. The formula is $Z_c=138\ log(b/a)$, *a* and *b* being the significant diameters of the inner and outer conductors respectively. If "*a*" is increased the resistance goes down, but "*b/a*" decreases and Z_c decreases, so that to pass the same power with a matched load, the voltage will have to drop and the current increase. These two effects act in opposite directions. Calculations show that there is minimum loss when *b/a*= 2.72 and Z_c= 60 ohms but it is a fairly broad minimum and small differences don't matter much.

However there is another important factor. When insulation is used, usually polythene, the capacitance is increased which has two effects; it decreases the wave velocity by the square root of the dielectric constant and the characteristic impedance by the same factor. If solid polythene is used, the constant is 2.25, the square root is 1.5 and the Z_c of minimum loss reduced from 60 to 40 ohms. Clearly, inevitably, the choice of 50 is a compromise. Bigger cables have lower loss because the conductors are larger with lower resistance.

75 ohms was an established standard for TV work quite early on and has been retained. Although the lowest loss is not usually necessary, in order to be reasonably close to the optimum, insulation with air space, or now gas-filled foam that has a smaller dielectric constant, is used to reduce the capacitance and hence allow a slightly larger core. The lower capacitance also means that the velocity factor is about 80% rather than 66% as with solid polythene.

Dr Bob Bennet ZL3RU

Thanks to ICOM NZ

Sir

On behalf of Branch 08 (Eastern Southland) I wish to express our sincere thanks to ICOM NZ for their very generous support when our Club purchased an ICOM repeater recently. Our club has a relatively small membership and a purchase such as this was a very daunting prospect. Sharon was very open to our request for financial assistance and her generosity was most appreciated. The new FR5000 Icom has performed without fault and I would recommend this particular repeater, with its programmable features to other clubs.

Lindsay Eunson ZL4LC

Internal Distance Records	144 MHz						
Propagation Mode	**Date**	**Station A**	**Locator**	**Station B**	**Locator**	**Distance Claimed**	**Mode**
Tropo	3/02/1982	ZL2ARW/P		ZL1BJB/P		1069	SSB
Field Aligned Irregularity							
Ionoscatter							
Aircraft Scatter							
Meteor Scatter Digital	28/10/2005	ZL1IU		ZL4LV		1214	FSK441
Meteor Scatter Non Digital							
Sporadic E							
Aurora							
Auroral E							
Moonbounce Digital							
Moonbounce Non Digital							

Overseas Distance Records	144 MHz						
Propagation Mode	**Date**	**Station A**	**Locator**	**Station B**	**Locator**	**Distance Claimed**	**Mode**
TEP							
Tropo	29/12/2007	ZL1CN		VK4DMC		3549	SSB
Field Aligned Irregularity							
Ionoscatter							
Aircraft Scatter							
Meteor Scatter Digital							
Meteor Scatter Non Digital							
Sporadic E							
Aurora							
Auroral E							
Moonbounce Digital	19/06/2005	ZL3TY		FA5ZF		19242	JT65
Moonbounce Non Digital	26/05/1985	ZL2BGJ		G3POI		18821	CW

Break-In 50 Years Ago

Craig Crawford ZL3TLB

AKTV2 Mobile

Another milestone in the progressive planning of television in New Zealand was reached when the Marconi Television Outside Broadcast Vehicle was recently completed at the factory in England.

The new television vehicle for Auckland is equipped with two 4.5 inch Image Orthicon cameras which achieve the highest standards of picture quality. Despite their complexity the cameras are compact and remarkably light, weighing only 94 pounds, and are designed for stability and long life under arduous outdoor service.

The size of the vehicle has presented some problems in shipment. Shipping space was originally reserved on the "Dominion Monarch" but closer examination revealed that the vehicle was too large to pass through the hatches of the vessel. Transportation of the van has now been arranged on the "Adelaide Star" which is due to arrive in Auckland on 18 February.

Considering the complexity of the fully equipped OBTV the order was fulfilled in record time, having been paced on the suppliers, AWA NZ Ltd, only sixteen weeks ago. From the main operating centre the picture to be shown is selected and the TC Camera Control Unit can be adjusted to vary the quality of the picture. The cameras provided with this van may be operated virtually "hands-off". Once initial adjustments have been made only two controls need be touched and several cameras can be operated by one man.

WANTED: copy for *Break-In*

My stock of articles etc for future issues is running low so I appeal to members to assist with material for publication. This could be short or long articles on any topic related to amateur radio and electronics, constructional articles, book reviews, equipment reviews, software reviews, branch activity reports, etc.

I should also like to receive articles on electronics related topics such as auto-electronics, home sound systems, workshop practice; in fact anything that hams might find of interest.

Thanks and 73,

John R L Walker ZL3IB (Editor)

Email <zl2tw@nzart.org.nz>

NZART CONFERENCE 2012 BRANCH 26

Tahuna Beach Conference Centre,
Nelson
Queen's Birthday weekend
(1-4 June 2012)

The Morseman

Gary Bold ZL1AN
<morseman@nzart.org.nz>

Ham CW Jargon

We use a lot of abbreviations in Hamming, and even more in CW. Many a learner, having mastered the code to a reasonable standard, has listened on the bottom of 80 metres for the first time and been perplexed by exchanges like

"zl1zzz de zl12yyy ge om tx fer qso hr name bill es qth puke ur rst 57n wid qsb/qrn nw xyl clg so cul ar 73"

This is offputting. The *Q* code abbreviations and word contractions are defined in many places, but where did the other ones come from? The callsign separator "de" is commonly thought to be French, much shorter to send than "from", or "this is". It came into use very early, nobody seems to know when.

Several other abbreviations came from American Landline Morse[1]. In the American Western Union telegraphy company's "92 code" of common phrases, the number 30 signified "half past the hour", the end of an operator's shift, and thus meant "the end of my transmission". In American Morse, three different dash lengths are defined, a "standard dash", (which was usually sent shorter than its International three-dot-length equivalent), a "long dash", used only for the letter "L", and an "even longer dash", used only for zero. Furthermore, the numbers didn't follow the orderly sequence that they do in International Morse. "3" is "di di di dah dit" and since zero was a "long dash", "30" was sent as "di di di dah di daaaaaaaaah". Over time, this was contracted to a single symbol, and adopted in International Morse, where, with no "even longer dash" defined, it became "SK". Some operators still send it with a long final dash.

The signal "es" means "and". American Morse defined a character for the ampersand (&), then commonly used in written communication, especially in telegrams. This was sent as "dit di di dit", one of those characters which had an internal space (between the first and second dits), shorter than the space between separate characters. The closest equivalent in Internation Morse is "es". International Morse has no character for the ampersand.

The end-of-message signal, "AR" comes from the American Morse letters "FN", meaning "finish".

We laugh using "hi", but in American Morse it was actually "ho". In this dialect, "o" is two dits with a "short space" separating them. In International Morse, this became initially, "hee" – two short dits attempting to partially replicate the "o" of American Morse - some old-timers (including me) still send it this way. This later morphed to "hi". Using it in audio conversations is poor form. Even worse is "hi hi". It would be better to recognise its roots and say "ho ho".

Why do we call it "CW", for "Continuous Wave" anyway? The waveform is not "continuous", it's switched on and off to form the characters. The term initially applied to the individual Morse elements, to differentiate between spark transmissions, where each element consisted of a string of closely-spaced tone-bursts, and those where the element waveforms were continuous sine-waves, or "CW". This method rapidly supplanted spark because of its greatly reduced bandwidth.

CW was first generated using one of two completely different methods. One, patented by Alexanderson, used motor-driven alternators, rotating at up to 20 000 rpm to produce HF AC which was keyed, and coupled directly to the antenna. These had an upper frequency limit of about 100 kHz. The second, patented by Poulson, used an oscillating electric arc coupled to a resonant circuit, shown in simplified form in figure 1. The arc took some time to strike, and if quenched, could not be rapidly started again. Hence they ran the arc continuously, and keyed it by shorting out a portion of the inductor in the coupled aerial tuning circuit, which slightly increased the frequency – the first FSK waveform! The Physics is complicated, and they found that the arc worked best when produced in a strong magnetic field, in an atmosphere of hydrogen. Both methods were used from about 1903 on, overlapping with the use of spark. Oscillators and amplifier using vacuum triodes, developed from Lee DE Forest's "Audion", began to supplant all these methods around 1912. These two original methods are now largely forgotten, but they are fascinating, and I will describe them in a forthcoming column.

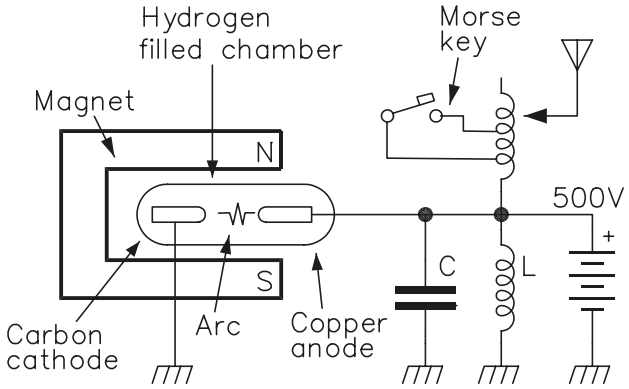

Figure 1. Simplified circuit of an arc transmitter.

The Powerless Modulator

In my Sept/Oct 2011 column I described, and showed the circuit of the simple single-807 transmitter with which I worked the world on CW in 1964. But there were a lot of local Hams who only operated 'phone, in those days AM. Having managed to pass the draconian 12 wpm Morse test with great angst and trauma (see the description in my Nov/Dec 2010 column), they resolved never to use Morse again, and they never did. But I used it exclusively.

We all knew each other, and they always expressed aggrieved outrage that I continually spurned them for the "smoke signal mode", never appearing on AM to talk to them. Thus, when I discovered the circuit of W6LNN's simple out-board modulator that simply plugged into the key-socket of a cathode-keyed class C transmitter[2] I built it to surprise them. See the circuit in figure 2, the version that appeared in the *ARRL Handbook* in 1956. It was called "powerless" because it required no additional HT power supply of its own!

The right-hand jack plug, labelled "Amplifier cathode", plugged directly into the RF amplifier cathode keying socket. About 50 – 100V were developed across the 6Y6G by the *RF* amplifier's plate current, and this was smoothed by a 1H, 2.2 kΩ, 50µF filtering network to provide plate voltage for the two left-hand resistance-coupled triode amplifiers, and also the screen grid of the 6Y6G beam tetrode output tube, chosen because of its ability to produce high current at low plate voltage. The amplified audio signal applied to its control grid caused the 6Y6G

continued on page 34

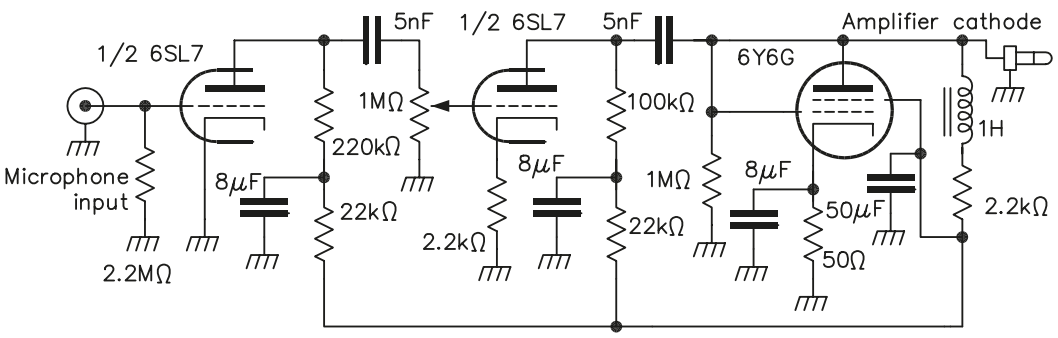

Figure 2. Circuit of the "powerless modulator".

continued from page 33

to act as a variable impedance in the cathode circuit of the *RF* amplifier, pulling its plate current up and down in synchronism with the audio. Hence, achieving what we called "cathode modulation".

This seems rather Mickey-mouse, since the voltage at the plate of the 6Y6G, varying with the modulation waveform, is also supplying plate voltage to the two input stages! However, it turns out that the *LCR* smoothing network irons out most of these fluctuations, and the 6SL7 doesn't seem to mind.

This strange arrangement worked surprisingly well. The instructions usually went something like: "tune up for normal CW operation, then plug in the modulator. The plate current should drop to about half of its previous value. If it doesn't, adjust the value of the 6Y6G's 50Ω cathode resistor until it does. Then talk, increasing the gain control. The plate current should show no change with speech input, except for a slight upward kick on voice peaks when the optimum gain is reached."

In practice, modulation percentages of 60 – 80% with acceptable audio quality were obtainable, but of course the output power was much lower; less than half of that using the same RF amplifier with a conventional transformer-coupled plate modulator, which was standard at the time. However, plate modulation of a 100W transmitter (the maximum power then permitted) required a beefy 50W audio amplifier with large and expensive modulation transformer, which an impecunious graduate student like me couldn't afford.

I muse on the simplicity and effectiveness of those early AM transmitters, given the low power levels that we were permitted. But there were no switched-mode power supplies or dimmer-controlled lamps operating in our houses, and few of us had noisy fluorescent lights, so the background noise levels on the bands were very low. Several schoolboys I knew were enticed into Ham radio by hearing the AM transmissions of the local Hams bursting through on their crystal sets over the top of the broadcasting stations, because their conversations could be understood. Many short-wave listeners, including my Father, often listened as well. Now, all they hear is SSB duck-talk.

Did you ever build one of these? Tell us how it went.

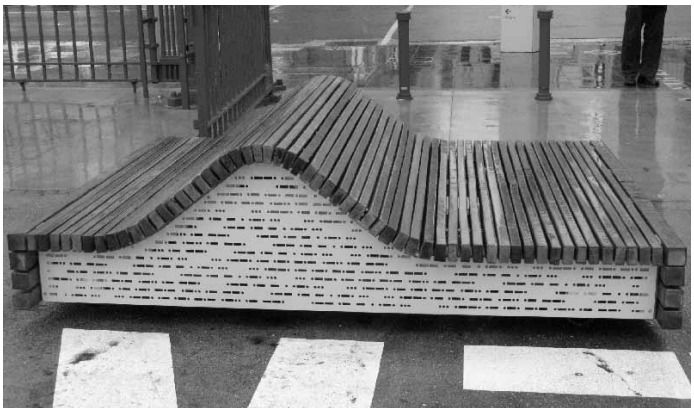

Figure 3. The sparklag seat on the Auckland Waterfront.

Propagation Predictions

The sunspots are rising, and the bands are waking up. The maximum of the current cycle will probably occur in late 2013. Unfortunately, this is predicted to be the smallest maximum in the last 80 years. Robin ZL3TIG emailed this:

"I stumbled across a website[3] which I have been using to identify potential Southland sites for the SKA radio telescope. I use it in reverse; if I can't get a signal into somewhere busy, then I can be pretty confident that radio interference sources there won't interfere with my proposed site. I haven't been able to verify its accuracy, but the results seem sensible.

"Apart from the fact that it plots results in dBμV/m, which not too many hams would find useful without guidance, it is by far the best on-line radio coverage map I have come across (I don't use commercial stuff).

"For lower frequencies and hamming, I use the VOACAP predictor[4].

"I found that this was pretty good at predicting 10m openings into Europe late in the evening before Christmas when the sunspot counts were high. I didn't believe the predictions at first, but sure enough I got a few EUs into the log. But, it (and presumably the VOACAP algorithms) doesn't seem to deal accurately with long path for me."

If you've never used an on-line predictor before, try this second one. It's very user-friendly. You select a location, band, mode, power, antenna type and run it. Another window appears showing a world map. colour-coded by "probability of achieving service" from your location. Another link invites you to see the coverage map on *Google Earth*. This shows the same map superimposed on a spherical earth with continental outlined boundaries, which can be rotated and zoomed.

Morse Code on Twitter.

Do you twitter and tweet? I do not, but some of you may. Basil ZL1TOW, sent a link to a *Gizmag*[5] URL which describes a device called *Tworsekey*, which enables you to update your *Twitter* status with a short message sent in Morse. This goes off via an Arduino Ethernet board. It's a "self build" project, devised by Martin Kaltenbrunner. Full details are given in another link to Martin's page, which includes a video showing it in operation. I have reservations about the quality of the one-finger Morse sent, on an American-style "flat-pad" key, but it seems to work fine.

Let me know if you build this, and what your experiences with it are?

A seat with Morse Code

Bob, KD2ADL, sent this email: "I was wondering if anyone in your organisation knows the story behind the piece of street furniture in the attached photo taken on 15 December. It is located at the intersection of Queen and Quay streets, by the Ferry Terminal in Auckland. I have been (unsuccessfully) trying to figure out what "sparklag waters" signifies."

See the photo in figure 3. Indeed, the repeated inscription on the side does say, in Morse, "*sparklag waters*". Other feedback told me that there is more than one of these benches, but I've not been able to visit the terminal to verify this.

I eventually found the email address of someone at the Auckland Council who might know about it, and today received an email which stated;

"Thank you for your email identifying the Morse code error on the Queens Wharf seat. "We have followed up with the designers, and it is indeed an error in Morse code. We have received three options from the architect on how to consider modifying the work to correct the error and are evaluating those now. We would like to retain some Morse code content but completely recasting the sides is cost prohibitive.

"I will let you know as soon as we come to a decision on the remedy."

So something will be done. I'll let you know what, when it happens.

Last Month's Problem

See figure 4(a). The previous transmission line problems were somewhat maths-intensive, so the

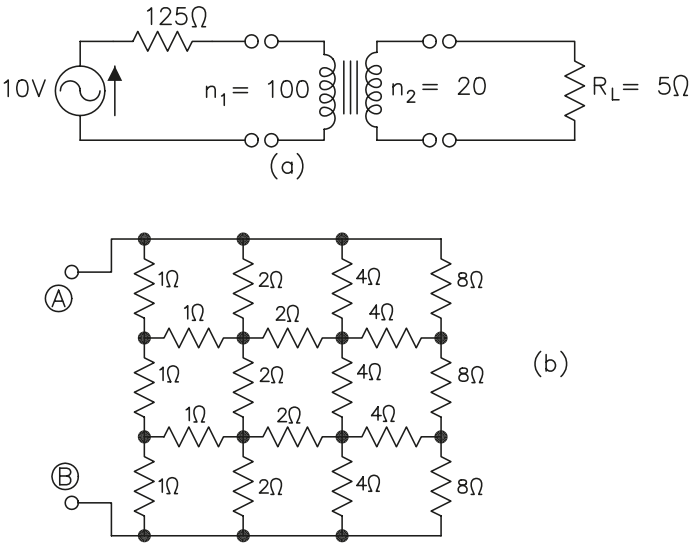

Figure 4. Top: Last month's problem. Bottom: This month's problem.

IARU – International Amateur Radio Union

Liaision Officer: John Lochhead ZL4QS
Liaision: Terry Carrell ZL3QL
Stuart Watchman ZL2TW, Peter Lake ZL2AZ

WRC-12 has finished and our thanks must go to Don Wallace ZL2TLL for his time and effort that he put into WRC-12. Attending this International conference is a daunting task and Don has represented NZART exceptionally well.
Don has complied the following report for NZART members information.

The World Radio Conference 2012

After four weeks of Plenary, Committee, Working Group, Sub-Working Group and Drafting Group meetings, WRC 2012 is now over. This report gives a brief summary of items that I think may be of interest to NZART members.

Proposed 500 kHz (or 600 metres) Allocation

As most NZART members are probably aware, WRC 2012 agreed to a worldwide Amateur secondary allocation from 472 to 479 kHz. This is less than we were seeking and the power level is less than what we currently have in New Zealand but the important thing is that there is now an international allocation with the potential to allow communications between a much larger number of countries than presently have access to this band.

Please Note: This does *NOT* mean that New Zealand Amateurs automatically have access to this frequency range in New Zealand; there will need to be discussions with the MED regarding how and when it is implemented.

Thanks are due to the many people who have contributed to this successful outcome – and in particular to Peter Lake, ZL2AZ, who has been involved from the very start.

Proposed Oceanographic Radar Allocations

Another item discussed at this 2012 conference was allocations for Oceanographic radar in various bands from 3 to 50 MHz. While none of the proposed allocations were in established Amateur bands, one of the proposed band segments overlapped frequencies around 5 MHz where some countries currently have been allocated either a band or individual channels.

After a very drawn out series (20+) of drafting group meetings, the final bands were agreed. Unfortunately this still includes an allocation (secondary in Regions 1 and 3, primary in Region 2) from 5.250to 5.275 MHz. This will need to be taken into account when considering the proposed future worldwide 5 MHz amateur allocation: see below.

Proposed 2015 Agenda Item. Potential 5 MHz (or 60 metres) Allocation

A paper from Cuba proposed that an allocation to Radio Amateurs around 5 MHz be included on the agenda for the next WRC. The New Zealand Delegation supported this each time it came up and, despite predictions to the contrary, the WRC 2012 decided to include it in the 2015 agenda, resolving to invite WRC 15 to consider:

The possibility of making an allocation of an appropriate amount of spectrum, not necessarily contiguous, to the amateur service on a secondary basis within the band 5 250-5 450 kHz.

This is, in my view, a very positive outcome but I think, based on the amount of discussion on the oceanographic item, and the attitudes some countries have to Amateurs, we will have to work very hard to turn this into a "real" allocation.

Other WRC 2015 and WRC 2018 Agenda Items

Included in the agendas for WRCs 2015 and 2018 are a number of items that have the potential to affect our current allocations:

- An agenda item for 2015 proposing a primary allocation to vehicle radar at 77.5-78 GHz – where we currently have a primary allocation;
- Two agenda items for 2015 posing potential threats to our allocation at 10 GHz;
- An agenda item for 2015 posing a potential threat to our allocation at 24 GHz; and
- An agenda item for 2018 regarding (commercial) micro and pico satellites which currently tend to use (and may want to continue using) Amateur frequencies.

As the work for WRC 2015 progresses, these threats may disappear and/or other threats may appear – we will need to carefully monitor the preparatory process.

Budget

Members will, no doubt, be pleased to hear that the costs to NZART of my attendance at WRC 2012 were well under the budget approved by NZART Council.

Thanks

I would like to thank NZART Council for supporting my attendance at WRC 2012, the New Zealand Government for including me in their delegation, and the large number of other people who have contributed, formally or informally, to the matters discussed above; it would not be possible to carry out my role without their support.

Don Wallace ZL2TLL,
Administration Liaison Officer

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last one one was more straightforward. The impedance transformation ratio of an ideal transformer is proportional to the turns ratio squared. Thus the resistance seen looking into the primary is

$R_{in} = (n_1 / n_2)^2 \times R_L = 125\Omega$

This forms a voltage divider with the 125Ω resistance in series with the source, so the voltage across the primary is $V_p = 10/2 = 5V$.

The voltage transformation ratio is proportional to the turns ratio, so the voltage across the 5W load resistor is $V_L = (n_2 / n_1) \times 5 = 1V$.

$R_{in} = (n_1 / n_2)^2 \times R_L = 125$

Correct answers were given by Graham ZL3GSL, Ron ZL1AI, Basil ZL1TOW, Alastair ZL2ARC, and Alan ZL1SAW.

This Month's Problem

Figure 4(b) shows the infamous third-order Binary Lonsdale ladder network. The resistor values increase from left to right by a factor of 2. It has no useful purpose whatsoever, except to test the computational insight of students of circuit theory. The question is, what is the resistance measured between terminals *A* and *B*?

It looks perplexing. But there's a simple solution if you think about it the right way.

Additional problem: The network is now extended to the right by adding an infinite number of additional sections, having resistors following the same binary increasing pattern. That is, the following vertical values will be 16Ω, 32Ω …, each increasing by a power of 2, with horizontal values increasing similarly. What is the resistance between terminals A and B of this infinite network?

References

1. See Table of American Morse at <http://en.wikipedia.org/wiki/American_Morse_code>
2. The "Powerless Modulator" *Break-In, 1954, page 191, and ARRL Handbook, 1956, p250.*
3. On-line coverage predictor <http://lrcov.crc.ca/main/index.php>
4. VOACAP coverage predictor <http://www.voacap.com/coverage.html.>
5. See the *Tworsekey* at <http://www.gizmag.com/tworsekey-morse-code-twitter-interface/21350>

VHF Scene

Simon Watt-Wyness ZL1SWW
<zl1sww@nzart.org.nz>

Well after the last issue covering activity over the Christmas / New Year break where there was plenty of activity, we still see things happening at this time. The weather has been a bit kinder to us with a few warm periods finally after the wet time over Christmas / New Year.

6m Happenings

During January, there have been various bits of activity from ZL to various places.

Rod ZL3NW worked JR2HCB, VK2ZQ. Mark ZL2WHO worked VK5BC, Kerry ZL2TPY, Bob ZL1NX and others also working DX. Many other contacts were heard along with many reports from JA, VK, E51, hearing a mix of ZL Beacons and TV carriers. All indications that the band is opening but people are not necessarily around when it is open.

Bob who was operating E51EME was working many stations including several ZLs.

February also had much of the same with band indicators showing up along with ZLs working into VK. 29th Feb had Bob ZL1RS cracking into USA with contacts to N5TSP, K9KK, K9IL, TI7/N5BEK all on CW 53-55.

Early March so far has been quiet from ZL perspective.

2m and above activity

Steve ZL1TPH outlines some of his major activities at Cape Reinga. "It was pre-planned mid 2011, to operate portable from Cape Reinga for a few days in the first week of January 2012 to activate a relatively rare grid square (RF65) towards VK on 144, 432 MHz and 1296 MHz.

The original emphasis was the 432 MHz band. That operation was reasonably successful with five VK stations worked on 70 cm. They were VK2AH, VK2BCC, VK2TK, VK2AMS and VK2DVZ. Distances ranged from around 1910 km to 2076 km.

Because the shortest path distance to Australia is around 1900 km a tropospheric duct was required. Those ducts are easy to predict ahead by three or four days using tools such as the Weather maps (on the VK logger) and the Hepburn propagation charts.

There was four days of portable operation from Cape Reinga. The site chosen this time was inland from the Cape about 11 km at RF65JM near Te-Paki trig or the Pandora track. This site was more private and was next to a now unused quarry.

Below are a few notes from each day of operation.

Monday 2 January 2012. Channel 5A TV (138.276 MHz) was heard in and out of the noise with weak tropo. No contact resulted to VK on tropo in the morning, but later in the afternoon there was a Sporadic E opening on 2 m and in the log were VK3DUT, VK3UH and VK3UCQ only. That was short lived and just after that occurred; tropo was now open to VK2. In the log on 2 m were VK2DVZ, VK2DO and VK2ZT.

Tuesday 3 January 2012. This day will always be remembered as the "Big Es Day". In the morning the tropo was getting better towards VK and CH5A was very strong. Worked on 2 m tropo were VK2BCC, VK2DVZ, VKDO, VK2ZT, VK2BX, VK2AH, and VK2TK, and on 432 MHz, VK2BCC and VK2TK in the log.

At midday exactly, or 2300z, while listening with head phones on, VK5BC/p was heard (to my surprise) on 144 MHz and we made an easy 55 contact both ways with a path distance of 3258 km. Then worked VK5NY just after along with VK5DK. Below is the 2 m Es logged that day ending at 2:08 NZT or 01:08z. In order of stations logged and all with Es: VK5BC, VK5NY, VK2KOL, VK2BCC, ZL4DK. Heard ZL4IS, VK5DK, VK3AMZ, VK2DO, VK3XPD, VK3AFW, VK3OE, VK-3AKK, VK3BDL, VK3LN, VK5DK, VK3ALB, VK3PY, VK3DUT, VK3OE, VK3AMK, VK3AXH, VK3GHZ, VK3OER, VK2MJW, VK3KU, VK-3GHZ, VK3ZLP, VK2ZT, VK3AXH, VK3LN, VK3UH, VK3EBQ, VK3UCQ, VK3ZQB, VK3NYG and VK5DK whom was the last station.

Wednesday 4th January 2012. Channel 5A very strong again. In the early morning the VK3RED beacon on 144.435 MHz was received at S2. There was a good tropo towards VK3, but no stations from VK3 were worked. That beacon diminished soon after and then the VK2RSY 144.420 MHz beacon was easily heard. It would appear that the inversion layer or duct was moving north. The VK2RSY beacon was short lived also. Often the case with past experience, as the morning goes on or with sun rise the temperature inversion weakens.

In the log that day with only tropo and on 2 m. VK2DVZ, VK2BCC, VK2ZT, VK2BX, VK2DO, VK2TK, VK2FLR, VK2KOL, VK2AH, VK-2TS, VK2AMS, VK2MAX and VK2AH. On 432 MHz worked VK2AMS, VK2TK, VK2DVZ and VK2AH. VK2ZT was heard on 432 MHz but not worked. Heard on 1296 MHz to VK2DVZ, with no two way contact.

Thursday 5 January 2012. The 2 m band was closed and CH5A was only heard with MS or meteor scatter. Two VK stations were heard on meteor scatter with full call-signs and they were VK2DO and VK2DVZ. One local contact and that was with ZL1CN. We then tramped to Te-Paki Trig.

Summary: Total stations in the log including beacons was 92. Actual individual stations worked to VK (including 4 ZL stations ZL2IP, ZL1IU, ZL2TAL ZL4DK) was 43 in total.

Radio gear: TS700A to a 200 W PA with VK5EME low noise 2m preamp with 5 element Yagi built by ZL1RS, FT817ND on 432 MHz feeding a 4M-120W Tono PA with 15 element Yagi on 432 MHz. ICOM 202 (or FT817ND) with MMT1296 feeding a 150 W PA on 1296 MHz. Numerous large rechargeable batteries. Headphones used for an extra 3 to 6 dB advantage."

Ted ZL2IP and Steve ZL1TPH had an attempt at 3.4 GHz from Cape Reinga to Mt Taranaki. They almost made it. Steve reports below.. "On the 30 January 2012 we visited Cape Reinga (once again) to attempt 549 km distance on 3.4 GHz to Ted ZL2IP in Taranaki. Over the winter months of 2011 we put together two 3.4 GHz transverters for this purpose.

An existing transverter was upgraded with oscillator injection referenced to a 10 MHz OCXO, and new transverter was built from the excellent VK3XDK kits. One TRV was with 16 W TX power and the other 10 W TX output.

Ted ZL2IP set up only a few metres up the road from his home QTH at 400 m ABSL. I drove up to Cape Reinga, a 2 hour drive from Mill Bay (far North holiday home) in the early morning to be QRV at 175 m ABSL. This attempt was considered the best day after analyzing weather maps and the Hepburn tropo propagation maps. Despite the best laid plans, propagation at 549 km on the 2 m band was down. Ted was only S1 on 2 m.

Because of the effort involved at both ends we decided to test 3.4 GHz anyway. At first with either carrier down or CW keyer running nothing

Ted ZL2IP's 3.4GHz equipment geared up for a record.

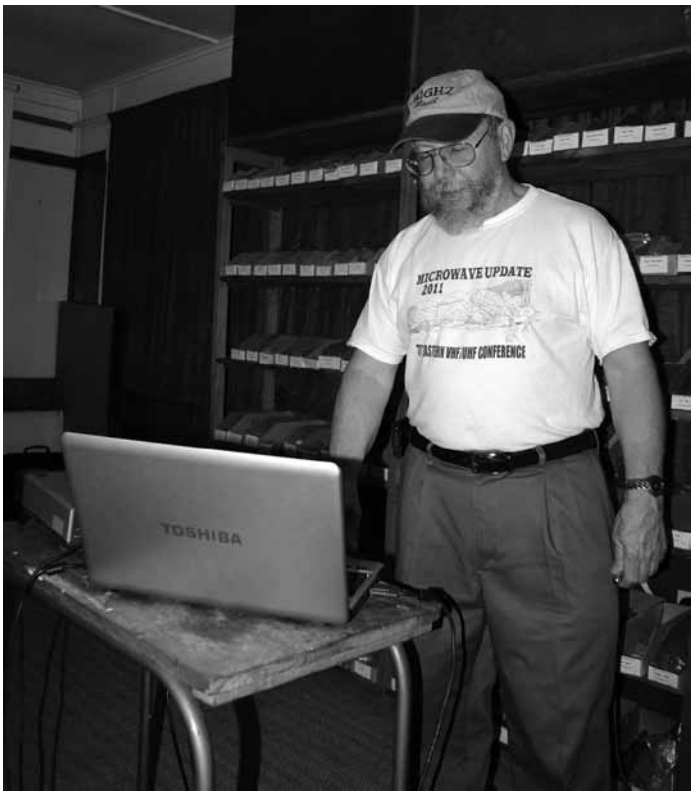
was heard. 1.2 metre diameter dishes at each end, with 30 dBi gain are rather sharp.

Then Ted was heard with carrier down and rather weak. We aligned dishes off that and found we were both ever so slightly off. Ted could also hear my CW keyer but in and out of the noise with QSB.

We both moved to SSB with headphones on at each end and called each other. I easily heard his transmission and signal report. But Ted could not receive my unique signal report to him. So we could not validate a true QSO via the radio band in question.

There was not enough SNR one way and CW on the day would be out of the question because of the sharp and brief QSB peaks. Digital modes such as either JT65C or FSK411 may have worked better on the day.

549 km distance on the 3.4 GHz is not exactly a short haul path, but we were both pleased to at least hear each other, which was a good test of station performance at each end, under some not so good propagation on the day."



Paul W1GHz presenting at Auckland VHF Group.

A Visit from a Very Special person.

Well known microwaver, Paul Wade W1GHZ, ex N1BWT, who brought us the *Online Microwave Antenna Book*, was passing through Sydney and Melbourne en route to New Zealand in February. A small team of John ZL1JD and Simon ZL1SWW arranged to have him come to the Auckland VHF group clubrooms and give a talk on some of his projects as well as a meet and greet session. Paul talked on getting on the air on 1296 and higher with various modular concepts that shared similar boards for 2304 and 3456 as well as a nice little 1296 transverter board. A local oscillator chain was also described to match up with the abovementioned units. This man has a wealth or experience and was a real buzz for many who turned up to meet him. People came from far and wide such as Whangarei to see him.

Paul also visited the Wellington VHF group members while travelling in the Wellington area.

He has many interesting topics at his website <http://www.w1ghz.org/>

Paul also is quite active on 10GHz rain scatter modes and is surprised that ZLs aren't making much use of it here. We have no excuse! (with all the rain we have!!). Some good distances have been obtained from his experience so we should give it a try.

History from the past..

Early 1296 MHz New Zealand history.

Some interest was raised amongst a few of the microwave team as to when the first 1296 contacts were made and with who and how. Brian Zl1AVZ comments. "My first experience on 1296 was a cross band contact with ZL1TAJ in Devonport from my QTH in Mt Albert. He was using a 2C39 tripler plus a corner reflector and I was receiving on a diode mixer and 4 x 11 element Yagis all home brew then. Signals were much stronger when he aimed at the Harbour Bridge. This was about 1963. My first 2 way 1296 CW contact was with Eric ZL1ADE whose Home Station was Mt Roskill. My home station was in Te Atatu South. This was about 1967. Some years later between about 1976-79, I worked ZL1TAB, ZL1TAA and ZL1BDU mostly using Microwave Modules™ Varactors. In about 1981, I worked Ray ZL2TAL portable at Carrington Road, New Plymouth on 1296 from Muriwai. Not sure of the date, but Ray may recall the contact. Around that time I also worked Brian, ZL2BFC at Newlands, Wellington, on 1296, once again from Muriwai."

Ted Zl2IP (ZL2TAX back then) adds "I have been reading through my first log book and see a couple of entries that are interesting after all this time. 17 December 1967 contact with ZL2TDW (Tom Bevan) on 1296.9 Stokes Valley to Karori distance 14 miles. "May be ZL record" in notes? I can remember sitting in a park up the valley with a reflex antenna and the converter sitting on a concrete block. 28 Feb 1968 was a contact with ZL2AZJ on 1296 Paekakariki to Stratford (SFD) plateau distance 126.5 miles "ZL record and VK also." in notes. It does not say but I am sure I was at SFD because I came home to Taranaki a lot those days during long week ends etc. Tom may remember being with Anthony on the Paekakariki hill. Unfortunately no details of gear, but I am sure I was running a BAY66 tripler and a through line converter with a diode mixer, no RF amp and a LO with 6J6's and a diode multiplier. This was prompted by a call from Pat Lynch ex ZL2TAH (last contact about 40 years ago!) and were reminiscing about 6J6's and little bits of brass tubing. My third contact in the log was with him on 12 Octocber 1963 on 440 MHz. (mod osc super-regen.)"

Tom Bevan ZL1THG (ex ZL2TDW) replies with, "I remember working Ted; if memory serves correctly I was behind the USSR embassy on a small rise. Cannot remember what the power source was most likely a 2C39 tripler, through line converter. On thinking back I am sure there was significance to the contact, Ted may be right, first in ZL. I think we did it to see if it could be done. It was hard enough to work across town on 432 in those days, no pre amps and low TX power, so 1296 was the challenge."

Rod ZL3NW ex ZL3TAL recalls his history. "My first 1296 MHz contact with Vern ZL3AQ was on the 31 August 1981 home station to home station. Vern had a Microwave Modules transverter and I had been building up a home made transverter and at that stage I just had a MRF901 as a TX amp (50mW) Another MRF901 was also used as a preamp, in fact two stages. I got 4/3 from Vern and I gave him 5/3. I was using a loop Yagi on a 20 ft length of water pipe and I think Vern just had the one loop Yagi at his end at that time. Very shortly after this I had added more TX stages. There was great ducting across the Canterbury Plains. We often found the signals were stronger on 1296 than 144. Vern's old 1296 MHz Beacon was used as a signal source and most of the time it was located just out of Ashburton at Murray Gills ZL3DJ QTH on his farm. It was used more as a weak signal source than a beacon and used to adjust receive preamps antennas etc."

Ralph ZL1TBG adds "I didn't have any equipment running 1296 till getting a MM Rx converter around 1980 and building a varactor tripler + 2C39A which made more noise blowing HT fuses than RF. My first logged contact was 7-11-82 from Moir Hill Road with dipole reflector feed (dish available but not deployed, it was raining) running 3 W to ZL2ARW on Horokiwi hill, ZL2TWS also listed as being worked in that contact."

2012 VHF-UHF-SHF DX Weekend Contest Results

Congratulations go to ZL4AA for cleaning up in the contest. Scores are as follows:
ZL4AARE54fe3478,

continued on page 38

Arrival of TV in Hastings and Napier

from David Walker ZL2DW

"There's TV in them thar hills" said Nobby Collins to his delivery boy (Ivan Small) at his radio workshop in Hastings.

Step forward a few years, to November 1962, where a meeting of industry people decided they would broadcast TV to the Hastings/Napier area.

Step forward again to 25 April 1963 and 5 watts of analogue, channel 6, TV began transmitting from Kahuranaki (680m asl) 18 km south of Hastings. The input signal at Kahuranaki was sourced from Kaukau at Wellington, channel 1 and was received on a rhombic aerial. A constant 100 μV of signal was received. From that it was translated to channel 6 and transmitted. The translator was built by Ivan Small (ZL2AJV) and transmitted the signal via a vertical corner reflector aerial, the aerial having been built by Peter Bone (ZL2TFL). (This Kahuranaki site soon after became a major Post Office 100 MHz Land Mobile repeater site. Amateur radio HB '670 was installed at Kahuranaki also, in 1976). Many people and organisations contributed with hardware and labour to enable the construction of the site requirements; to name some, Nobby Collins (ZL2BGG, a late comer to amateur radio, he became a SK on 26 February 1987) Peter Bone (ZL2TFL, he became a SK on 27 May 1999) Ivan Small (ZL2AJV).

Peter Bone ZL2TFL up the corner reflector pole at Kahuranaki.

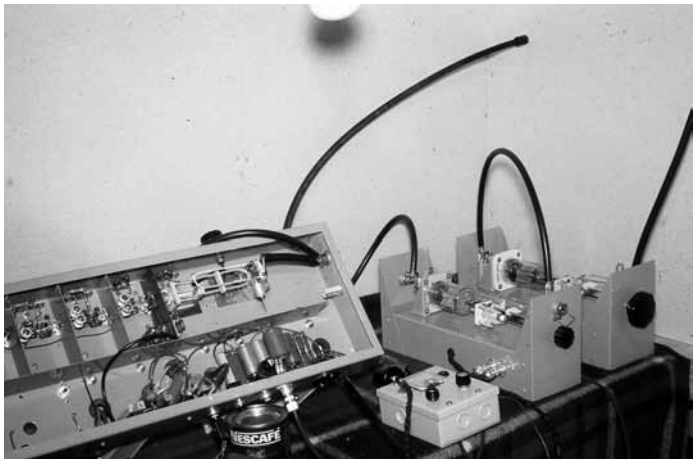
Ivan told me that the original weather board building at Kahuranaki leaked due to strong wind-blown rain so it was reclad with sheet metal.

A completely new translator and aerials etc were established on Te Mata Peak (closer to Hastings) in late 1965, where the input signal was obtained from Wharite, Manawatu. In 1966 the NZBC began transmitting from Mt Erin (only a few km's south of Hastings) so this Te Mata site was disestablished.

My thanks go to Ivan Small for his contributions and pictures, allowing me to compile this story. βi

David Walker ZL2DW
Hastings

Rhombic receive aerial at Kahuranaki.



Translator building and Ivan ZL2AJV at Kahuranaki

REMEMBER:

Leave a three second pause between overs when using repeaters.

Someone else may have an urgent message.

◂ continued from page 37

ZL3RRRE66et1213,
ZL2FAERE78lx592
ZL1SWWRF73ir189

David ZL4DK adds "Had a damp contest at ZL4AA (I guess there's a reason why they call it Swampy Summit). Not exactly raining but continuous misty cloud streaming past at ground level (750m ASL) for most of the contest. The sun shone through it once just enough to cast a shadow but it didn't last. Band conditions seemed OK. Had some good contacts with ZL2FAE on 2m and faintly heard ZL2OK. Even 6m seemed to get some tropo with strong signals at times from the ZL3s. No sign of any Es. The regular ZL3s were all there on 70cm, again good signals at times but a lot of QSB at other times. Only managed one local contact on 23cm."

2012 VHF-UHF-SHF Contest Calendar

The next contest is the Low Band Contest, 50 MHz to 440 MHz, on Saturday the 14 and Sunday the 15 of April 2012. This is the weekend after Easter. The operating times are: Saturday 1700 to 2300 NZST and Sunday 0700 to 1300 NZST.

The contest after that is the Hibernation Contest, all bands 50 MHz and up, on the 9 Saturday and the 10 Sunday of April 2012. This is the weekend after Queen's Birthday weekend. The operating times are: Saturday 1700 to 2300 NZST and Sunday 0700 to 1300 NZST.

The next contest is the Brass Monkey Contest, all bands 50 MHz and up, on the 4 Saturday and the 5 Sunday of August 2012. The operating times are: Saturday 1700 to 2300 NZST and Sunday 0700 to 1300 NZST.

The Contest Rules are available at: <www.vhf.org.nz/VHF-UHF-SHF-ContestRules>. All contest logs should be sent, to arrive within two weeks, to: <zl2wa@clear.net.nz>

Summary:

Many thanks go to the contributors who help make this column happen with their input; ZL1TPH, ZL4DK and others. If you have input and pictures for the columns ahead; such as DX activity reports, repeater installation, branch activities, snippets of interest, technical items etc, please send to Simon ZL1SWW <zl1sww@nzart.org.nz> or *Call-Book* addresses. (I also accept large picture files sent via email).

Next deadline for copy is **10 May**

Digital Modes

Murray Greenman ZL1BPU
<zl1bpu@nzart.org.nz>

Radio Droids

You may recall that in the last column I made reference to Androids, i.e. devices such as 'Smart Phones', which run the Android operating system. This operating system has some similarity to LINUX, in that it is largely open-source and has many active developers, both private and commercial. Programs for Android devices are necessarily simpler than PC programs, since the devices they run on have more limited resources, but that doesn't mean that they are lacking in features. There is some pretty good stuff about!

I recently bought a second Android device, an inexpensive 'Tablet' computer. It has no phone, camera or GPS built in, but has a very good 180mm colour screen. The software includes one of the popular book-reading applications, and it certainly does a good job as a book reader. It uses WIFI as its connection to the Internet, and I found connecting really easy. I also found a cool 'ap' that allows me to see all the memory on the tablet from my desktop PC via WIFI, which makes transferring information back and forth really easy. The tablet is a great device for reading emails in bed, or checking the program guide while sitting in front of the TV, and it will do a lot more than a dedicated e-book reader.

Radio applications for Android have been a little slow coming. I recently wrote to Vojtech OK1IAK, who wrote the really excellent program PocketDigi[1] for PocketPC devices. He replied saying that he had no plans as yet to rewrite it for Android devices, as he is buried under business and family activities. He did say however that he thought it would be much easier to develop Ham programs on Smart Phones, as they have a good operating system and support floating point maths. He thought porting a PC program would be the best approach.

The first Amateur Radio digi-mode programs for Android phones have now started to appear[2]. I've not been able to try them yet, but they include separate applications for PSK31, RTTY, a Morse decoder and Morse trainer. These programs are not expensive, just a few dollars, and can be downloaded from Android Market. I have not found touch-screen keyboards too easy for fast typing, and am not personally in favour of the alternative canned-message approach to QSOs. I prefer to talk to real people, not just to button pushers!

One application that particularly appealed to me was the Voice Keyer. While intended for such applications as calling 'CQ Contest', the application includes a timer, and can be used to record MEPT or digital mode transmissions for later transmission using the timer. You could build the radio interface and use this program as a really simple MEPT source.

In order to operate these modes with a Smart Phone, you'll need one with a biggish screen and of course audio input and output, such as the popular Samsung Galaxy S2. You will also need to build or buy a radio interface[3]. There's not much to it, and it would be easy to build your own. The main reason for the interface is the need to generate the PTT signal from the audio (like VOX) as there are no convenient hardware ports on a Smart Phone to operate the PTT.

There are also some digi-mode apps for other mobile devices (e.g. Apple) Let me know of your experience with any of these mobile radio applications.

Cheap DDS VFOs

Just the other day I had a very cheap direct digital synthesizer board brought to my attention[4]. I can't imagine finding a 0 – 30MHz synthesizer anywhere at a better price! This unit (only US$8 including shipping!) is about the size of two postage stamps, is completely built up ready to go, and can be controlled by fairly simple PC software.

This kit uses the AD9850 chip and includes a 125MHz crystal oscillator as reference. I have been looking for a simple DDS as the starting point for a new LF Exciter design, and this might well be it. The existing LF Exciter[5] only goes up to 350kHz, and it would be great if it included 600m, and operating up to 30MHz would be a real bonus! This unit seems ideal. I have one coming so I can play with it, and I'll keep you posted.

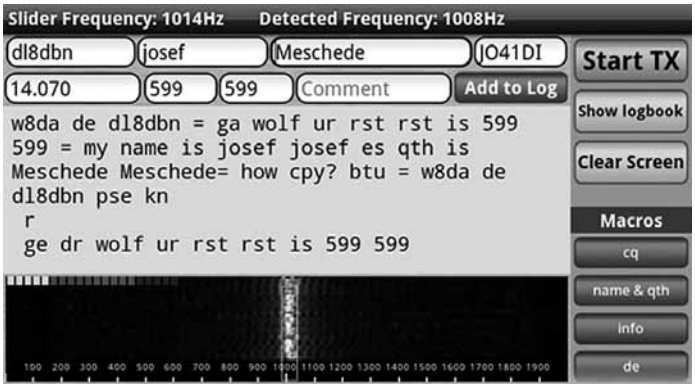


Figure 1. DroidPSK screen shot

So what's the difference between a VFO and the LF Exciter? Well the frequency agile LF Exciter has no display or local controls like a VFO, but can be remote controlled, using a serial link, so can be computer controlled. It can operate a wide range of different modes; whatever you can tell it to do – at least a dozen ASK, FSK and MFSK modes. More than that though, it includes information to allow it to generate many useful modes all by itself, so all you need to do is send it a text file containing the messages you want, and the modes to use. Then it will operate all on its own without needing a PC connected. So I guess this winter's project will be a new Mk 2 LF/MF/HF Exciter!

OPERA® Mode Revealed

As mentioned previously, it's not helpful when developers of new modes don't release the technical details of their new mode. Without this information it is not possible for the technically savvy to determine where it is best used, or even what resources are required. A further problem in some countries is that they may not be permitted to use new modes without prior approval of the regulating authority, or without public domain information on how the mode is coded. OPERA has fallen into this category, just as did ROS, a previous family of modes from the same source.

Two years after its release, we still don't have details of the ROS modes, and as a result, even though they have been found effective under some conditions, they are little used internationally.

Similarly, there has not been any official information on OPERA from the developers. All we were told was that it was on-off keyed (like CW Morse), at a given symbol rate, and that was about it. Now however, one of the really clever QRSS enthusiasts, Guido PE1NNZ, has been able to fairly thoroughly reverse engineer it, and has found out that the mode has a 51-bit highly packed text message using a limited alphabet (along the lines of WSPR), uses a CRC and a scrambler, and uses a Walsh-Hadamard error correction algorithm (as in MT63) and Manchester encoding. This type of coding doubles the number of symbols required, but ensures that the data clock is easily recovered. It also accounts for the signals sounding rather like Morse. One nice feature of OPERA is that there are no timing issues; you don't have to start the transmission or reception at a specific time, and if conditions are good you will often get a message decode without receiving the whole message.

You can read Guido's complete analysis on the OPERA group web pages in the 'Files' area.[6] You need to be a member of the group to read these files.

OPERA Workout

OPERA has had a fairly thorough workout on the bands in the last month or two; all the way from 9kHz to 6 metres. It seems to be particularly popular on LF and MF. One irritating feature of the software is that the mode and band are tied together, so if you wish to test some modes on other bands, you can't do it with a CAT equipped radio,

continued on page 40

continued from page 39

as you have to set the radio and software separately, and even then the reporting mechanism reports the wrong band.

In some European countries the 600m licence permits only CW operation, and while this mode isn't Morse code (the usual interpretation of 'CW'), it is certainly a CW mode. I don't believe it is as good as some other modes, but in CW-only countries, this is less relevant.

My own tests on 600m proved fairly conclusively that when compared with WSPR under identical conditions, on longer paths (ZL – VK), WSPR was better by a wide margin (100% reception of two minute frames over two hours), while OPERA only managed about 10%. Interestingly, the same test showed better results with OPERA over the path to Wellington.

I ran the tests using my new DG8SAQ MEPT synthesizer and N7KSB-style 100mW power amplifier (described in the last column), on 508kHz. ZL-VK on 600m with 100mW and an inefficient antenna (perhaps 1mW EIRP) is pretty good DX in any mode! The receiving stations were VK2DDI and ZL2AFP.

The test message was dual mode, WSPR then OPERA2, each mode transmitting for two minutes, and arranged to transmit a new message in each mode every 10 minutes. It was a bit complicated to operate, as I needed two computers (one for each mode) and had to manually switch the synthesizer USB connection from one computer to the other twice every 10 minutes for about four hours! The two computers ran the same DG8SAQ software, but used different scripts for the two different modes, and were set to transmit two minutes apart. Both receiving stations could receive both modes at the same time.

New Weak-Signal Receiving Aid

Con ZL2AFP has sent me a trial version of his new receiving aid program. It is intended for receiving weak signals by ear, and is especially good for LF and MF CW at hand-sent speeds. It will however work fine on HF and is helpful with SSB. The main feature of this program is a truly excellent noise reduction system based on a Least Mean Squares (LMS) algorithm, which performs many repeated, simple, but very fast calculations. This technique is most effective at enhancing coherent audio tones buried in random noise. It's not as effective for digital modes, and it won't recover signals completely buried in noise. There should be a screen shot of the program in this month's *'Longer Wavelengths'* column.

The program also has an excellent noise blanker, a very sharp band pass filter and some very effective notch filters. Because the filters are all based on an FFT (Fast Fourier Transform) technique developed by Lionel G3PPT, they are very deep and have infinitely sharp edges with no ringing – the true 'brick wall' filter. The filter edges and notches are easily adjusted by simply dragging them across the screen.

The new program is used in the usual digital mode manner, by feeding receiver audio to the computer. Rather than listen to the receiver however, you listen to the output from the software via the PC speaker, and with so much less noise, is less tiring to listen to. The input level and noise reduction controls interact a bit, but you soon find an appropriate setting, and besides, the software includes useful AGC. I find that the noise blanker improves the effectiveness of the noise reduction.

Although the result is really best experienced by ear, I've included a screen shot of part of the program display, illustrating without the LMS filter (left) and with the filter (right). I had to adjust the brightness, but no other changes were made between shots. The signal on 508kHz was about 10dB above the noise, and by ear was virtually noise free with the filter in. You can see by comparing the lower half of each shot that the noise is markedly reduced with the filter in.

The software has two tuning displays, the upper one a spectrum display (audio spectrum analyser), the lower one a fixed-speed waterfall display, from which you can readily read Morse with a bit of practice. The software is a good tool for non-directional beacon (NDB) hunting on LF and MF. If you connect an antenna directly to the computer sound card, with this software you can receive VLF signals up to 22 kHz directly with no receiver! The program should be released for public use as soon as testing is complete.

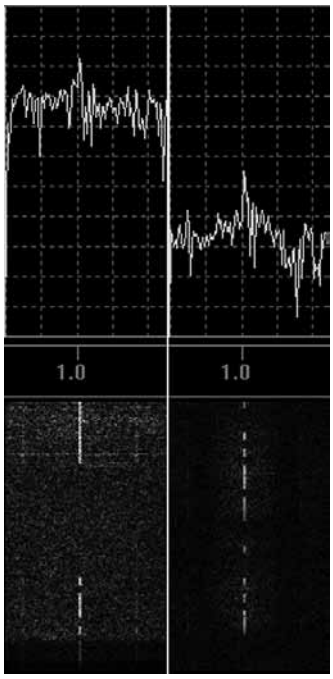


Figure 2. LMS filter effectiveness

Lentus Mode

You no doubt know about MultiPSK, the multi-mode digital mode program developed by Patrick F6CTE[7]. Yes, that's the one; the program with hundreds of control buttons! It covers more modes than any other program I know, and while it can be difficult to drive, the performance of MultiPSK is very good. Well, Patrick has released a beta version which includes a new HF weak-signal mode he is developing. This mode is called LENTUS (Latin for slow!), and it is a fixed-frame 32-FSK mode with some similarity to WSPR, but which is a QSO mode. It also has beacon and repeater functions.

Each transmission, which contains just 75 data bits, is almost five minutes long, and must start on the round UTC five minute point plus four seconds plus or minus 100 milliseconds! Of course you use the internet to synchronise the computer clock.

The transmission bandwidth is 23 Hz, the data rate is 0.1465 baud, and it uses Reed-Solomon error correction. The new mode is incorporated in a test version of MultiPSK. At the time of writing, this can be downloaded from [8], but you may need to hunt for a new version by the time you read this.

The Lentus mode is well described in a document that is delivered with the software, as it should be. I've not had the opportunity to test the new mode thoroughly yet, so will report later; watch this space.

Other New Software

Take a look at the new version of EasyPAL[9]. EasyPAL is a digital SSTV system developed by Erik VK4AES. It uses error correction, so (assuming you can receive all the corrections) every picture is perfect. The latest version of ROS, mentioned earlier, is V7.0.3[10]. The latest version of my favourite digi program, FLDIGI is V3.21.40[11]. There is also a new version of SDRADIO by HB9DRV[12].

There's a very useful page (if your French is any good) of recent Ham news[13] maintained by Jean-Marie F6GIA, which lists the latest Ham software from all over the world. The Southgate Radio News[14] is another excellent source for general and digi radio news. This bulletin is widely read, and the editors also welcome input, so send them your news.

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[2] <www.wolphi.com/>
[3] <www.wolphi.com/android-apps/droidpsk/droidpsk-to-ft817-interface>

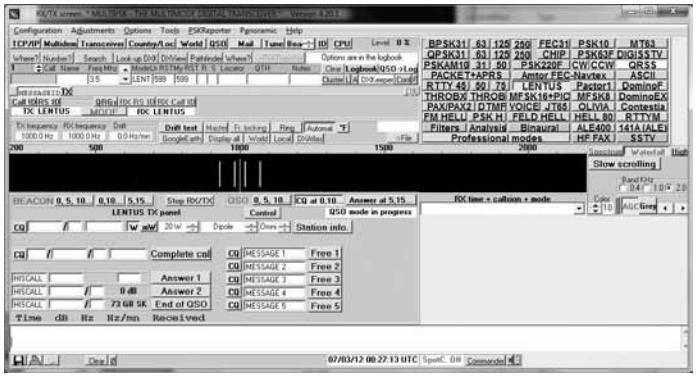

Figure 3. Screen-shot of MultiPSK in LENTUS mode.

Satellite Orbits

Andrew Barron ZL3DW
<ad.barron@xtra.co.nz>

The amateur radio satellite HAMSAT VO-52 ceased operating on 28 February, at the moment (7 March), neither its beacon nor the 435/145 MHz SSB/CW linear transponder are operating. This is the first ever interruption in the services of HAMSAT since the launch date on 5 May 2005. But it is not all doom and gloom; subsequent reports indicate that the control station now has control over the satellite and that the satellite is healthy and will return to service soon.

There are lots of new CubeSats on the way. Students at the University of Liege are hoping their satellite OUFTI-1 will be launched towards the end of this year. OUFTI-1 will be the first satellite to test the use of the D-STAR communication protocol in space. This means of radio-communication will be made available to ham-radio operators worldwide.

"ET phone home", cell phones in space! Space researchers at the University of Surrey and Surrey Satellite Technology Limited (SSTL) have developed 'STRaND-1', a satellite containing a smart phone payload that will be launched into orbit around the Earth later this year. STRaND-1 (Surrey Training, Research and Nanosatellite Demonstrator) is being developed by the Surrey team to demonstrate the advanced capabilities of a satellite built quickly using advanced commercial off-the-shelf components.

STRaND-1's lead researcher Dr Chris Bridges explained why a smart phone made an ideal satellite payload "Smart phones pack lots of components; such as sensors, video cameras, GPS systems and Wi-Fi radios that are technologically advanced but a fraction of the size, weight and cost of components used in existing satellite systems. And because many smart phones also run on free operating systems that lend themselves to online software developers, the creators of applications ('apps') for smart phones could feasibly develop applications for satellites".

Smart phones aren't designed to go into space, so in addition to extensive ground testing prior to launch there will be an in-orbit test campaign to put the phone through its paces. A powerful computer built at the SSC will test the vital statistics of the phone once it is in space. The computer will check which components of the phone are operating normally and which components malfunction in orbit. Images and messages from the phone will be sent back to Earth via the radio system. Once all the tests are complete, the micro computer will be switched off and the smart phone will be used to operate parts of the satellite.

Vega launched successfully on 13 February, and deployed eight student built amateur radio satellites.

RS-39 (Chibis-M) was deployed from a Russian Progress M-13M rocket into a 500 km orbit on January 24. The progress rocket was on a re-supply run to the International Space Station so the RS39 orbit is similar to ARISS. RS-39 has CW beacons on 435.315 and 435.215 MHz. Riku, ZL1KLP reports via the AMSAT-UK FUNcube user group that "RS-39 was received loud and clear in NZ". Reports on the cw telemetry data sent to the RS-39 control team at <amateur-rs39@chibis.cosmos.ru> will be confirmed by a special QSL card.

Fox is an AMSAT USA project scheduled to launch two cubesats

"PWSat, launched 13 February, has a FM to DSB UV mode transponder"

in the next few years. The team has just had some great news, the first satellite; Fox-1 has been approved as part of NASA's "Educational Launch of NanoSat" programme which means that the educational content was enough to justify a free ride into space.

Fox-1 is currently under development. It will have a U/V (70cm uplink with 2m downlink) FM transponder, magnetic stabilization, and a science experiment. It is planned to be launched into a 650km circular orbit in mid- to late-2013. The FM voice repeater should have performance matching AO-51's FM transponder with 400mW EIRP; but from a satellite that measures only 10cm x 10cm x 10cm. Once Fox-1 is launched, it will be followed in 2015 by Fox-2, which is planned to carry a software defined linear transponder. Fox-1 will have special "ZombieSat" features that are designed to extend its usable life.

- Fox-1 is designed to operate in sunlight without batteries if the battery system fails open or shorted. This applies lessons learned from AO-51 and ARISSat-1 operations.
- In case of IHU failure Fox-1 will continue to operate its FM repeater in a basic, 'zombie sat' mode, so that the repeater remains on-the-air.
- The FM transponder will continue to work even if contact with the ground control station fails.

Fox-1 is designed as the immediate replacement for AO-51. Its U/V (Mode B) transponder will make it even easier to work with modest equipment. From the ground user's perspective, the same FM amateur radio equipment used for AO-51 may be used for Fox-1. Extending the design, Fox-2 will benefit from the development work of Fox-1 by adding more sophisticated power management and Software Defined Transponder (SDX) communications systems.

Students at Morehead State University are building an amateur radio Cube Sat with a propulsion system that will raise the apogee of its orbit from 500 km to 1200 km. RAMPART, plans to launch on a Minotaur from Vandenburgh in June 2013. It is a 2U CubeSat and will use a self-contained, warm gas, propulsion system to adjust satellite's initial circular orbit of 500 km to an eliptical orbit with an apogee of 1200 km and perigee of 500 km at a 45 degree inclination.

This is very important technology for future amateur radio satellites and is especially interesting for ZL operators, because higher satellites have much better coverage, are workable for longer periods, and stay in orbit longer due to less orbital drag.

Its construction will also demonstrate the use of 3D printing for manufacturing small satellites. The students are proposing a UHF downlink of 9k6 GMSK AX25 packet on a downlink frequency of 437.325 MHz.

As always I am keen to hear about and publish details about your satellite activities, so please drop me an email to <zl3dw@nzart.org.nz> and photos are especially useful. I am also very happy to answer any questions that have you puzzled or will help you get started.

73 Andrew ZL3DW

Vega Launch Cubesat Amateur Band Frequencies

AlmaSat-1	437.465 MHz 1200 bps FSK, 2407.850 MHz
E-St@r	437.445 MHz 1200 bps AFSK
Goliat	437.485 MHz 1200 bpx AFSK
MaSat-1	437.345 MHz GFSK 625/1250 bps CW
PW-Sat	435.020 MHz FM uplink, 145.900 MHz DSB downlink
Robusta	437.325 MHz 1200 bps FM telemetry (data every 1 min, 20 sec. burst)
UniCubeSat	437.305 MHz 9600 bps FSK
XaTcobeo	437.365 MHz FFSK with AX.25

[4] Item 260967834514 at <www.ebay.com>
[5] <www.qsl.net/zl1bpu/MICRO/EXCITER/>
[6] <groups.yahoo.com/group/O_P_E_R_A_/files/>
[7] <f6cte.free.fr/index_anglais.htm>
[8] <f6cte.free.fr/MULTIPSK_TEST_25_02_2012.ZIP>
[9] <vk4aes.com/EasyPal-01B-MAR-2012-Setup.exe>
[10] <f6gia.no-ip.org:8000/ham_ROS-v7.0.3.zip>
[11] <www.w1hkj.com/downloads/fldigi/fldigi-3.21.40_setup.exe>
[12] <www.ham-radio.ch/kits/sdr-radio.com/1.5/Beta/SDR-RADIO_v1.5b952.exe>
[13] <www.qslnet.de/member/f6gia/>
[14] <www.southgatearc.org/>

AREC – Amateaur Radio Emergency Communications

Geoff Gillman ZL3QR and Bev Gillman ZL3OV

AREC Mission Statement:
To be the preferred provider of Emergency Communications to New Zealand Emergency Services.

Hi, Everyone. This issue we have a most interesting story on communication experiments here in the Canterbury area. This is still on-going so, hopefully, there may be some updates sometime in the future. On the local scene here in North Canterbury, there have been some changes. After more than twelve years as S/L, Geoff ZL3QR has stood down for medical reasons and former Dep. S/L Don ZL3DMC has taken his place.

Tactical HF Deployment for AREC

Introduction

Since 2006, two frequencies in the 5MHz (60m) band have been made available for AREC operational use. The use of these two spot frequencies is by agreement with the original licensee and subject to a number of specific rules.

During this period, Christchurch Branch 05 AREC has, on a number of occasions made use of these frequencies with varying success. More recently, the team has been looking at a number of factors associated with successful deployment of HF radio in a tactical sense. Search and Rescue operations in and around the Canterbury area often demand the use of HF radio as the ability to deploy VHF repeaters can be severely constrained.

This article describes a recent HF deployment to provide communications for the Classic Kayak race over a section of the Waimakariri River Gorge and some of the decisions and learning points that have come from that operation.

Operational Use of HF

Each year the Christchurch AREC team has provided communications for the river sections of the Coast to Coast Multisport event, and the Classic Kayak race on the Waimakariri River. The course is over the river section between Mt White Bridge near Arthurs Pass and Gorge Bridge near Springfield. The river section comprises sections of a steep walled gorge and follows a winding course as it heads east and south from Mt White to Gorge Bridge. Communications are required between a number of shore stations and jet boats providing safety cover and marshalling for the kayak competitors in both races. This terrain means that even using repeaters, VHF and/or UHF options are limited leaving a significant role for HF radio.

In recent years the solar cycle has been at or near the sunspot minimum, causing less than ideal HF propagation conditions. This caused a greater challenge as we have attempted to provide reliable communications throughout the day and over the entire course. Although the Coast to Coast event extends well into the evening, the river section is completed by dusk, with the remaining cycling and running sections covered using VHF.

Significant points:

- Total course length (as the crow flies) is approximately 35 km (although the competitors cover 67 km)
- Number of shore stations is at least five (although there may be more depending on river conditions)
- Mobile operation is required (in jet boats) using HF whip antennas
- Space is at a premium in some of the locations

Tactical HF Deployment

Tactical deployment in this context is the establishment of communications for a defined period and to cover specific area or locations. It differs from the more normal HF communications enjoyed by Amateurs where the goals are usually distance and/or the greatest number of different stations that can be worked; but the ability to stay in near continuous contact is not a requirement.

The goal of tactical communications is to be able to communicate effectively as and when required between stations for the entire duration of the event. This means that consideration must be given to these elements:

- Antenna selection
- Operating mode
- Frequency selection(s)
- Terrain

The specific solutions to a tactical deployment will vary from place to place, with time of year, time of day and operating conditions. In the particular circumstances described above, some of these issues are:

- Short overall distances (as the crow flies)
- Limited options for antennas on jet boats
- Daylight operation timeframe with early morning start and often a late night finish

As indicated above, the short distances coupled with the very radio unfriendly terrain dictate a need to deliberately utilize Near Vertical Incident Sky-wave (NVIS) operation. This decision directly impacts on the choice of frequency(s) and the style of antennas.

The term "deliberately utilize NVIS …" perhaps needs further explanation. It is well known that the vertical radiation pattern of a half wave horizontally polarized dipole antenna has a null or radiation minimum at 90º (straight up) when the antenna is at least ¼ λ above the ground. This immediately presents a practical problem in that ¼ λ for 80m is some 20m above ground and even for 40m a ¼ λ is 10m above ground; not normally practical options for portable operation.

By mounting the antenna lower, the angle of radiation increases until at about 0.15λ, it reaches a maximum at 90º. Reducing the height further the maximum radiation still occurs at 90º, but the amplitude decreases (i.e. the gain reduces) as the antenna gets closer to the ground.

The short distances involved for this course (35km as the crow flies) mean that the launch angle for our signals needs to be at about 85º to bounce down again where we need it (at the furthest point), indeed nearly vertical.

Deliberately utilizing NVIS operation means setting up antennas that make the most of NVIS characteristics and using frequencies that offer the best NVIS performance.

For about the last three years or so, the sunspot activity and general HF conditions have not been especially good with T index values being close to or less than zero. Only in the last twelve months has the T index started to rise significantly. This has meant that in the early morning and late afternoon, the optimum frequency choice has largely been confined to 80m. Signal strengths have been fair to medium for shore stations and have decreased during the middle period of the day.

Jet boat signals have varied from usable in the morning to needing station by station relays later in the afternoon. Last year, for the Kayak race in early December, we made some conscious decisions around the HF configurations.

Looking at NVIS operation, it is generally recommended that the optimum working frequency is 80% of the MUF (Vertical) or fof2 as it is referred to by the Ionosphere Prediction Service operated by the Australian Government <www.ips.gov.au>

Checking the IPS website for the area and dates, and working within frequencies and bands available to AREC, this suggested that this time operation at 5MHz would be the best option for this particular event.

NVIS Antenna options

Considerable reading and research into NVIS antenna operation has revealed some interesting information. Of course the problem with research is that some practical comparisons are needed to confirm which elements do actually work in the local context!

Some of the findings were that;

- Optimum antenna height for NVIS operation of horizontal dipole antennas is between 0.1 and 0.15 wavelength
- That as the antenna height is reduced below 0.1 wavelengths, the vertical gain reduces and could reduce by more than 10dB depending on final height and ground conditions
- That lowering the antenna below 0.1 wavelengths may improve the Signal to Noise ratio as distant electrical noise pickup is minimized
- That using an "inverted Vee" configuration at the same average height as the horizontal dipole introduces as much as 6dB (vertical[1]) performance penalty
- Horizontal dipoles at NVIS heights are essentially omni-directional (in respect of the horizontal radiation pattern) and do not exhibit the normal nulls from each end.
- Point 1 presented a problem! For 80m operation, the optimum

height for max vertical gain was approximately 8.3m (about 27ft) at 3.6MHz which is difficult to achieve. At 5MHz this improved to 6m (about 18ft)

- Practically we can usually (easily) achieve 3 to 4m to support a horizontal dipole, so our vertical gain would be noticeably reduced.
- The average height of an "inverted Vee" at the peak at 8m is 4m, but there would be an additional penalty of approximately 6dB incurred; not a good idea if we have to operate at lower than optimum!

On the day we had two stations reasonably near each other (although separated by terrain), one equipped with an inverted Vee and the other with a horizontal antenna. The difference in path length was about 3 km. The additional gain from the horizontal antenna was particularly noticeable as the day passed, and signals from this station which were much more reliable for a greater portion of the day.

Jet boat operation with whip antennas did, and still does, present problems. The whips are understandably lower in efficiency, and can hardly be described as being an ideal installation. To maximize the signal being radiated upwards instead of at a low take off angle, we followed advice to bend the whips over as much as possible.

Unfortunately, although we achieved useable signals, there are other factors that have meant that we are unable to be as certain as to how much of an improvement may have been obtained. We did note however that, antenna tuners are required to compensate for the detuning caused by bending in proximity to the hull. The detuning can cause the base impedance of the antenna to change enough that the transmitter will start to reduce power (VSWR protection).

Frequency Selection

Operating at or about the 80% of the MUF is the ideal. Unfortunately, the available amateur bands and frequencies (e.g. 5MHz) do not always fall nicely for this. The other factor that needs to be considered is that the MUF changes during the day and night, and generally rises around the middle of the day to early afternoon.

Operating too far below the MUF can mean that signals are lost with increased absorption by the D and E layers as they are ionized by the sun.

During the kayak race, we found that the received signal strengths fell significantly towards midday and during the early afternoon. To overcome this we had to relay signals from boats via one or more shore stations.

Later investigation using Local Area Mobile Prediction (LAMP) charts produced by the Australian Government prediction service, suggested that better results would have been achieved by operating on 7MHz (40m) for this part of the day. During this period the horizontally polarized shore station antennas were generally noted as having performed better than those stations with inverted vee antennas.

One of the problems with having to change frequency is that of co-ordination. To be safe really requires that the base station must have receivers operating on both frequencies at all times (two receivers and two antennas). This catches those stations that cannot make contact on the expected frequency and may try the second choice. Two frequency operations can also cause practical problems. Shore stations are limited in the amount of kit they can take and may have restrictions on available space at the selected location. It needs to be remembered that shore locations are determined by operational needs – not suitability for radio operations.

Final Thoughts

Although the section has provided communications over this part of the river many times, there are still opportunities to try new (different) techniques. This time we were able to confirm that deliberately attempting to optimize NVIS operation with our selection of antenna options and frequencies can provide tangible benefits.

We have noted that greater attention to frequency selection(s) is needed. Whilst the use of 5MHz during the early part of the day worked very well, we needed to consider the option of a change to 7MHz later on. Obviously multiple frequency operation brings risks as well as potential reward.

Antenna tuners were beneficial on shore stations where antennas that were low to the ground and presented lower feed impedances. The resultant VSWR could then be easily managed. We will look at further use of antenna tuners for both shore stations and jet boat mobile operations.

The availability of 5MHz frequencies definitely provides useful options for tactical HF deployment. With the current state of the sunspot cycle, 3.5 and 7MHz are too widely separated to be able to provide consistent HF operation between specific locations. 60m provides AREC with a valuable option in establishing a communications circuit.

Richard Smart ZL4FZ / ZK9EA.

Activity Briefs

(A selection from Jan / Feb.)

1/1/2012. Wairarapa Branch 46. SAR. Search in the Holdsworth area for a 45 yr old American tourist tramping on his own and failed to turn up at the agreed time. The local helicopter with a Police officer checked the hut logbook and found he was intending to walk out to Walls Whare. He was intending to go around the Powell-Jumbo circuit, but met a couple at Rocky Lookout who suggested Totara Flats is a nice place for camping. So even though he did not have a map of the area he went down to Totara Creek, he lost the track going down towards Totara Flats and did not get there until Friday or Saturday night, he was pleased to find the hut and dry out. He then tried to find his way out by going down stream where the helicopter located him in the river.

6/1/2012. Tauranga ECG Branch 88. Sports & Training. Tauranga Domain, Tauranga. The North Island Colgate Games being held at the Tauranga domain from 6, 7, 8 January 2012.The local Athletic club is expecting over 6300 people to be involved from athletes aged from 7 to 14 years of age, parents, grandparents, and a number of officials. Over 1800 athletes are also expected. The role of AREC is to supply 10 VHF handhelds and one VHF base station, charging station and spare batteries for the duration of the games issued to marshalls covering each event. Instructions for using handheld radios and procedures for marshalls. Establish base station in announcers' box using ESB07 simplex.

7/1/2012. Marton Branch 23. SAR. West of National Park Village. Missing day tramper, female age 25, lagged behind group of 3 and became lost on return from day trip. Found next day at 1130hr fit and well, located by helo when inserting search teams. Ops concluded by 1430hr.

11/1/2012. Manawatu Branch 20. SAR. Whariti. Missing person. Missing person returned to station.

15/1/2012. Wellington VHF Group Branch 74. SAR. SAROP Titahi Bay. Missing Swimmer. SAROP land and sea search for missing swimmer. MP body washed up a few days later and found by Police.

16/1/2012. North Canterbury Branch 68. Rural Fire. Eyrewell Forest. Forest on fire. NZFS units searched for supposed fire. Nothing found. Forestry unit which had far greater distance to travel, was turned back while en route. Extensive lightning activity far to the East of the forest, is believed to have given a false impression of a fire to those who called it in.

24/1/2012. Wellington VHF Group Branch 74. SAR. SAROP Missing day walker called in lost. Day walker left track and got lost. Phoned police when injured himself. MP found on track the next day at 11.00.

28/1/2012. Wairarapa Branch 46. Sports & Training. Provide Comms for Annual Jumbo - Holdsworth Trail race and Hooper Loop race. 82 competitors on the main race and another 60 on the Hooper loop race. Several runners turned back as they missed cut-off time to top or just pulled out due to weather.

3/2/2012. South Canterbury Branch 34. SAR. 9km SSW from Fairlie, South Canterbury. A search for a hunter overdue the previous night. He had fallen and lost consciousness. He was found by helicopter on its last pass before search teams were sent in. AREC set up base at the Fairlie Police Station ready for the waiting search teams to

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be tasked. A radio check was the only message before person found.

3/2/2012. Wairarapa Branch 46. Sports & Training. Wairarapa Fishing Club-Superfish event at Castlepoint. Provide comms for Annual Superfish fishing competition held at Castlepoint over 2 days. 20 boats with 2-5 anglers per boat plus land based anglers. All comms on AREC Marine repeater CH18. No problems with comms apart from faulty radios and aerials in boats due to lack of maintenance.

5/2/2012. South Canterbury Branch 34. SAR. Little Mount Peel. A tramper had phoned to say he was lost in poor visibility on Little Mt Peel. With phone battery going flat could only receive txt, but was guided back to track, found by search team and guided out. AREC had set up base at the Geraldine Police Station operating VHF when missing person was found.

6/2/2012. Motueka Branch 24. Sports & Training. Motueka River valley. Provide comms for annual Motueka river Raft Challenge, at Alexander Bluff bridge, checkpoint at end of Whakarewa St., and finish at Motueka bridge. Six kayakers on the river had Tait handhelds. AREC operators on land had ICOM handhelds. The weather was fine and sunny. There was only on incident. Comms Control was alerted by a kayak that two rafts hit rocks in a fast flowing section of the river and disintegrated. The kayak rescue team were immediately despatched to the scene. Luckily no one was hurt but it took a couple of hours to get the wreckage off the rocks. Hot food and cold drinks were provided at the Motueka bridge by locals.

13/2/2012. Papakura Branch 65. SAR. Huia, Auckland. Two trampers over due to come out from a days tramp. Found by Police Eagle helicopter beside a stream with no walkable track.

13/2/2012. Manawatu Branch 20. SAR. Whariti. Missing female found deceased.

15/2/2012. Thames Branch 41. SAR. Opoutere, near Pauanui. Search for 84 year old fit experienced tramper overdue. Found next morning cold and wet.

17/2/2012. Wairarapa Branch 46. Sports & Training. Ngawi Big 3 Fishing Competition. Provide comms for annual fishing competition for boats entering and leaving the water. 132 boats with 1 day cancelled due to bad weather conditions.

22/2/2012. Otago Branch 30. SAR. Taieri Gorge, Dunedin. Search for 2 male university students who were overdue from a rafting trip in the Taieri Gorge from Hindon to Outram Glen. The Civil Defence Emergency Communications Unit was deployed to Taieri View Rd where the ESB 57 Repeater was setup. Teams were deployed with VHF hand held radios and POLSAR HF radios. The missing party was located some 5 hours into the search when they arrived at Outram Glen.

Conclusion

Thanks to those who have contributed to this issue. Material for the next one to please be in our hands by 3 May 2012. Photos, if included. preferably on a separate CD (with captions) mailed directly to us. E-mail pix may be acceptable but will be at the Editor's discretion and must not be embedded in the text. Contact details: <zl3qr@nzart.org.nz> or <zl3ov@nzart.org.nz> or post to 6 Boyd Street, Rangiora 7400, or phone (03) 313 7137.

(N/B. Articles to please be in doc. rtf or txt format. Publisher or pdf we can not use. Thanks.)

Reminder

The next Section Leaders Nets should be 16 April and 25 May, 3900 kHz USB at 1930 hr NZST unless notified otherwise.

Until next issue,

73, Geoff ZL3QR & Bev ZL3OV.

References

[1] This is specifically for VERTICALLY directed radiation (NVIS operation). This is not the case for low angle (DX) operation, where the inverted vee is a good antenna for medium distance working.

[2] In respect of the sky-wave component only! The ground wave remains directional as expected.

Awards

Awards Manager: Alan Chapman ZL3GX
<awards@nzart.org.nz>

I have not been notified of any local awards for the next few months so I have included the IARU Region 3 award. Those of you who have been working DX may be able to find sufficient contacts to enable you to apply for the award. There are log sheet available from the NZART web site under the awards section. Alternately send an email to the Awards Manager and I can send you a copy. Both addresses are at the bottom of this column. You can just use a plain sheet of paper but please include the country in your log.

IARU Region 3 Operating Award

To publicise Region 3

1. The award is available to licensed amateurs and SWLs.
2. Contacts made after April 5, 1982 are eligible.
3. QSL cards *not* required. Send certified list of eligible contacts from Logbook. Include Country in log.
4. Cost is $3.00, overseas US$4.00. (3 x NZ$1 stamps okay)
5. Eligible countries are those in Region III whose amateur societies are members of IARU Region III Association. These are: Australia, Bangladesh, Brunei, China (PRC), Chinese Taipei (Taiwan), Fiji, French Polynesia, Hong Kong, India, Indonesia, Japan, Korea, Macau, Malaysia, New Caledonia, New Zealand, Pakistan, Papua New Guinea, Philippines, Pitcairn Island (VR6), Singapore, Solomon Islands, Sri Lanka, Thailand, Tonga, Vanuatu, Vietnam. Plus: One Country credit from US Territories in the Pacific from Guam, Northern Marianas, American Samoa, Wake Island, Baker Howland Group, as presented by ARRL, or Chagos Archipelago (VQ9), represented by RSGB. Current total of available "countries" is 35. Requirements for Award as from 1 January 1986: Basic, 7 areas; Silver Endorsement, 15 areas; Gold Endorsement, 20 areas. These to by reviewed as considered necessary by the custodian who would recommend appropriately to the Secretariat.
6. Awards may be endorsed for any mode or band.
7. Applications to: NZART Awards Manager.

Club Awards

Clubs running short-term awards or new awards should send details of the award to me via email or at my *Call-Book* address or the address below. Remember that *Break-In* is only published on even months and copy, including, if possible, a copy of the certificate, for inclusion, should reach me by the end of the even month.

The Awards Net runs on 80m, 3.677 MHz every night from 0800 UTC every night of the year. Every one is welcome to join in especially if you are mobile and in a rare county or district.

NZART Awards Manager, PO Box 1733, Christchurch 8140. <awards@nzart.org.nz>, <www.nzart.org.nz/activities/awards/>

INTERNATIONAL AMATEUR RADIO UNION
IARU REGION 3 AWARD
This Certifies that
Sample ZL3XYZ
has fulfilled the requirements for this award

IARU Region 3 Award Certificate. Black type on blue card with both Silver and Gold Endorsement stickers.

DX Downunder

Graeme Hunt ZL1ANH and ZL1T
<graemeh@xtra.co.nz>

HF conditions have been fairly good over the last few months, but 80m has been noisy and the Africans haven't been appearing on 10m like they were. By the time you read this we will be in the equinox so hopefully the bands will be humming. There have been some great DXpeditions; Malpelo HK0NA in particular and VP6T Pitcairn made an appearance as did Somalia and several other rare Africans. The operation from Annobon off the coast of Equatorial Guinea in February was difficult to work. The Solar Flux Index has been hovering just above 100 and with some solar flares thrown in it hasn't been as good as it was 6 months ago; however, several DX contests have meant plenty to work. It is interesting to note how all the bands seem in much better condition during contest weekends, the DX is probably there all the time if you call CQ.

Last year I used the special call ZL50GH to celebrate my 50 years on the air, and had many more contacts than I normally would. I thought that perhaps this related to my unique call, but I am finding that there are just as many replies to my CQ if I use my ordinary call. I now think it was my enthusiasm that meant I had so many ZL50GH QSOs – obviously they are there if you go on the air.

Spratly

Many ZL's have been looking forward to the Spratly Island DXpedition for some time. One scheduled for 2011 was cancelled because of transport problems and the organizer, Chris VK3FY, has just advised that this DXpedition which he was overseeing has been postponed indefinitely. All is not lost, however, as the Malaysian Amateur Radio Society are sending 30 operators to Pulau Layang Layang Island from the 10th to 24th April. Look for 9M0L from AS-051, it is a relatively easy shot from ZL on most HF bands, but expect some major pile-ups.

Not just operating

There's more to DXing than just talking on the radio. That won't happen unless you've got a decent station and most hams are only too happy to help out fellow DXers with advice and antenna raising. The Kerikeri guys got together recently to re-erect Don ZL1HH's tower which he had taken down to repair. Hopefully Don will be back on the air shortly with his 4 element quad on 20/15/10. Coincidentally my Company (DX QUAD) had manufactured his antenna in 1980, but Don's claim that it is still under warranty is under consideration.

Diamond Award

DXCC is an award program run by the American Radio Relay League (ARRL) which many readers will be familiar with, even if not active participants. ARRL maintains a list of countries and entities, like the Chatham Islands which counts as a separate country to New Zealand because it is more than 350km from its "mother" country. ARRL is organising a special Diamond Award to commemorate the 75th anniversary of DXCC. It's running during 2012 and certificates are issued for working 100 or more countries, the snag is the countries are as they were in 1937. It's fascinating to see how the world has changed, for example, where on earth was the Bismarck Archipelago, and Danzig was a country and is now the city of Gdansk in Poland. The French colonies were huge; French Equatorial Africa contained four large current countries while French West Africa contained 8. I can't see Antarctica on their list and what they did with Nauru is a mystery. You can learn more at www.arrl.org/diamond-dxcc. Go to their Entity List for a spreadsheet of 1937/current entities. QSLs are not required. But it's not as easy as it appears!

"Spratly Island is actually about 100 islands in the middle of the South China Sea and their ownership is contested by many surrounding countries."

From ZL2iFB

Conditions have been distinctly variable of late with a number of solar flares knocking out the high bands for days on end. Between the flares, I was very pleased to catch 6O3A from Somali Republic on a couple of bands, plus HK0NA (Malpelo Island), C21HA, 4W0VB, VP6T, FW0NAR and various T32s on several bands, making a good start to the DXing year.

Every year I compete in DX challenges such as the CQ Marathon <DXmarathon.com> and the annual league tables at <Clublog.org>. In essence, I reset my DXCC counters to zero on January 1st and see how many DXCCcountries I can collect in the course of the year. The year-round DX events are quite different to contests, more like a marathon than a sprint. There's no mad rush to complete every QSO and move on to the next so it's good to have the time to chat to DX ops who are also not in a hurry (obviously I don't delay them if they are working pileups!). Being 'intune' with conditions works well for me, which means listening often enough to recognize whether conditions are up or down. Finding long path openings, for example, means the chance to work stations who are blocked from us in the short path direction, and others who don't expect to be working ZL at that time of day.

Thanks, Gary.

Read the manual

It is well known that men do not need to read manuals. I purchased a Yaesu FT1000MP MkV over 7 years ago. There was something I wanted to do with it recently and now can't remember what it was. That will be of no surprise to those who know me, but my point is I finally sat down and read the manual from front to back. I discovered heaps about the black box I didn't know. For instance if you press the TX switch/LED under the B VFO, the B VFO jumps to the frequency of the A VFO and here's the good thing,

"The author, Graeme ZL1ANH, is appropriately dressed for tower raising in hard hat and running shoes. Mike ZL2AUA is doing the real work up the tower while Don ZL1HH drives the digger."

plus or minus an offset you preset via the menu. Now if I'm listening to DX on A VFO on 14007 and he is listening up, I push the magic button and B VFO comes up on 14009 and becomes the TX VFO. My split is set at 2kHz because everybody else is 1 kHz away, and I can tune B VFO anyhow. But you've all read your manuals and knew that already!

It's only a hobby -1

VK0TH

This message from a rare DX station speaks for itself:

"VK0TH QRT Operator: Behavior has become a problem. JA and EU stations constantly calling over other stations, don't hear or jam and have turned a fun hobby into a stressful environment. I worked over 200 JA stations today (13/14 January) and when sending "NO JA" in the call it all got very ugly. I will be QRT for the next few days while I re-evaulate how much radio I will continue doing while on Macquarie Island and how it is done. My apologies to those that wanted VK0/M. I can't see this behavior changing and I'm not willing to spend my free time doing something that is no longer fun. My apologies. Trevor."

It's only a hobby -2 ZL1ANH

I was on 15m and answered the

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CQ of an IK2 station, worked him and I moved to 20m. Eight minutes later I appeared to spot the IK2; I never did, and my ZL1ANH spotting was done via a Spanish portal. It appears the IK2 is spotting himself using pirated calls. He did the same with two other ZLs and a VK callsign. Why anybody would be so desperate, and what he hopes to achieve by this escapes me. There are always those that cheat, and I can see that some bent contesters may find this of use.

You will all have experienced similar events. I've been reflecting on these and many more instances and have concluded that's human nature. There will always be people who cheat or try to push their way in; forget about road rage, I've seen it on the golf course and in fishing competitions and I'm sure it's in all walks of life.

I'm sure *Break In* readers wouldn't be like this; if you are, take a deep breath and get a life.

DXpeditions

Plenty to look forward to:

Afghanistan T6MO for next 12 months

Angola D2QV Valery is active on CW, SSB and RTTY: 40m/20m/17m/15m/12m/10m till July 2012

Burundi 9U look for HA3JB, now living there. 20m SSB and PSK31

Congo Democratic Republic 9Q, Sergiy UV5EVJ will be active from the Province of Katanga till May 9th. He is there as part of a UN peace-keeping mission Sergiy is currently waiting for a call-sign

Djibouti J28RO until July 2012

Franz Josef Land R1I two hams are wintering over until September 2012

Gabon TR Sebastien, F4EIH, will be in Gabon for at least three years from February. He plans to operate SSB, PSK31 and JT65 on the HF VHF, EME and Satellite

Lesotho 7P8GF Gert, ZS6AYU, will be active May 2013. Note; not this year.

Malta 9H3PP Zoltan, HA5PP, will be active as 9H3PP during the CQWW WPX CW Contest in May Morocco CN2RN between April 3-30th

Marshall Islands V73NS for the next three years

Micronesia V63YWR William is a new operator resident on Federai Island, mainly on for family phone patches but will happily exchange reports after they are over

St Paul Island CY9 will be active on all bands and modes between late July and early August

Singapore 9V1RM for the next three years

South Sudan now has a new prefix Z8

Spratly 9M0L is now planned for 10-24 April – website <http://9m0l.legendchew.com/ >

St Paul Island CY9M A group of 10 operators will be active between 26th July and 1st August

Tanzania 5H9CP between June 11-22nd.

ZL Special Calls; none advised for this issue

Nets

ANZA Daily: DX net at 0515z on 14183 kHz and now also Saturdays 0445z on 21205 kHz. Mondays, Fridays and Saturdays it is followed by the Pacific DX net on the same frequency from 0600z.

Arabian Net: Fridays only 0500z 14250kHz – host JY5HX and features exotic Middle East calls.

ZL DXers: Tuesdays 8pm NZ 7105kHz summer, 3777 kHz rest of year

What's on the air now? <www.dxsummit.fi/DxSpots.aspx>

Announced operations: <www.ng3k.com/Misc/adxo.html>

QSL information: <www.qrz.com>

Sunspots: <www.solarcycle24.com/>

Acknowledgements

ARRL DX, 425 DX, OPDX, DXNL (Darc), ARLD044 DX News. Contact me at address or by email at <graemeh@xtra.co.nz.>

Ron Wright ZL1AMO Silent Key. ZL has lost one of it's most prominent DXers, Ron held every award imaginable, was a superb operator, always helpful and had activated many rare entitities. No doubt there will be full tributes later.

FMTAG – Frequency Management and Technical Advisory Group

Secretary: Doug Ingham ZL2TAR
<fmtag@nzart.org.nz>

Proposals

None this time.

Final recommendations to Council.

At its 18 of February 2012 "face-to-face" meeting, NZART Council approved the following Final Recommendation. Branch 60 Taupo has applied for a VHF Linking Station (VLS) at Maroanui, located at TOPO50 BF36 634.01 323.75, to provide a link between the Maroanui 675 repeater and the Taraponui 725 repeater. The link transmit frequency will be 147.850 MHz and the receive frequency will be 147.250 MHz.

Comments and Applications

Please send your comments and suggestions on the above matters, and on any other FMTAG matters, by e-mail to: <fmtag@nzart.org.nz>.

Applications for repeaters, beacons, digipeaters, point-to-point links, and so on, should be made on the latest version of FMTAG Form 10. The latest versions of FMTAG Form 10, and the explanatory Form 10A, are available on the NZART website: <http://www.nzart.org.nz/fmtag/index.html>

Completed forms should be sent by e-mail to <fmtag@nzart.org.nz>

The current status of Applications can be viewed on the NZART website: <http://www.nzart.org.nz/nzart/fmtag/fmtag-apps-being-processed/>

Licence transfers from NZART to NZART Branches

As described elsewhere in this issue of *Break-In*, NZART Council has resolved to encourage the transfer of repeater, beacon and point-to-point linking licences from NZART HQ to NZART Branches.

The following Branches (and Affiliates) will benefit from the licence transfer:

03 Western Suburbs
05 Christchurch
08 Eastern Southland
11 Gisborne
22 Marlborough
23 Marton
24 Motueka
25 Napier
26 Nelson
28 Whangarei
29 North Shore
33 Rotorua
34 South Canterbury
35 South Otago
37 Southland
38 Taumarunui
42 Titahi Bay
46 Wairarapa
48 Wanganui
49 Westland
51 Eastern Bay of Plenty
55 Waitomo
56 Christchurch West
60 Taupo
61 Central Otago
64 North Otago
66 Auckland VHF
67 Kawerau
68 North Canterbury
78 Far North
82 Southern Wairarapa
84 Bay of Islands
85 Mercury Bay
86 Suburban
87 South Taranaki
Auckland AREC
CARDS

Please contact FMTAG by email for more details of the transfer process: <fmtag@nzart.org.nz>

NZART needs YOU in 2013

NZART Conference held over Queen's birthday weekend each year is hosted by branches nationwide.

Council is urgently seeking a branch, or combined branches, to host the 2013 annual conference. Can your area help?

If so please contact Debby at HQ for further details.

SPAM – Society For The Preservation Of Amplitude Modulation

Roy Symon ZL2KH
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Nets:
3.850 MHz (AM) Friday nights at 2000 hr local time.

New member:

There is one new member to welcome this month. He is: # 315, ZL2TBH, Gary Henderson, Lower Hutt

Annual General Meeting

The Annual General Meeting of the Society For The Preservation Of Amplitude Modulation (SPAM NZ) will be held on the Sunday morning of Queen's Birthday weekend (3rd June 2012) at the NZART Conference in Nelson. The business to be conducted will include the election of officers and other usual AGM matters. If you are unable to attend and would like to nominate someone for a position please send your nomination to me. Nominations will need to be seconded – and the permission of the person being nominated will also be necessary. I will not be attending the conference in Nelson. My grateful thanks to Jim ZL2BHF who has volunteered to chair the SPAM AGM. Also I will not be available for re-election as Secretary / Treasurer and *Break-In* contributor so a volunteer will be needed for these positions to ensure that SPAM can continue to function.

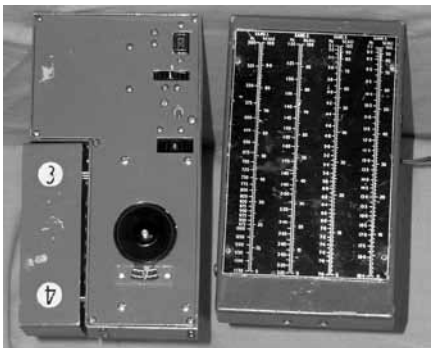
The Radio Reception Set Mk.301; a mystery radio.

By John Walker ZL3IB, <john.zl3ib@ihug.co.nz>

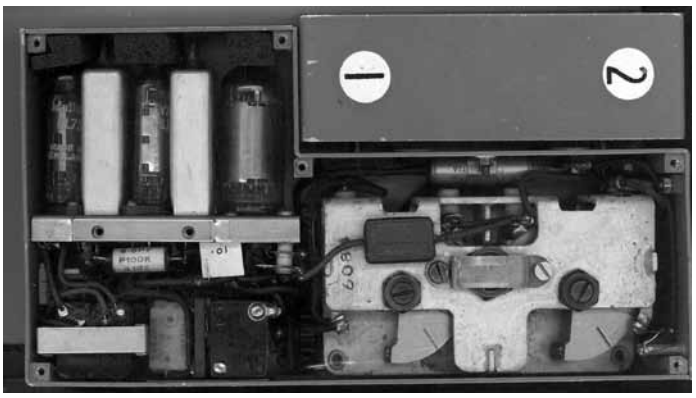
My interests in vintage radio are mainly concerned with communications-type receivers so I was highly delighted when a fellow NZVRS member presented me with the strange little set to be described here. It was of obvious military origin and obviously British-made but that was all that was known about it. In its day it would have been the ultimate in miniaturisation and my guess is that it was designed to be dropped to wartime resistance groups or similar clandestine operations. Since then I have managed to identify it thanks to the NZVRS web page. Whilst surfing this page I had a closer look at the military radio section where I found the site <http://home.wxs.nl/~meuls003/receivers/receivers.html> which listed mostly military radios as described in *Wireless for the Warrior* (vol 3) by Louis Meulstee PA0PCR. Further exploration revealed a description of the Radio Reception Set Mk.301 which seemed very much like my little "mystery set".

Subsequently I contacted Louis and to my delight he very generously sent me full details, circuits, service info, etc for this set. It seems that the Type Mk.301 was British made and there was only limited production. Little is known what and for whom this set was designed but Louis Meulstree suggests that the Mk.301was produced for use in clandestine operations, use at embassies and in limited numbers by special forces such as the SAS. The earliest data on the receiver goes back to about 1954. In its day it would have been a model of miniaturisation.

Here is a brief description. The set comprises two grey steel boxes, each about 170 x 90 x 35 mm and weighing just over 1 kg. One is the main receiver whilst the other houses the 'A' (1.5V D cell) and 'B' (67.5 volt) batteries, plus it has the dial calibration scales its upper side. The receiver is a five valve superhet covering from 500kHz through to 18.4 MHz in four bands and band changing is achieved by plugging in the coil box (the small rectangular box at one corner) in one of four positions. The front panel controls include the main tuning knob which has a dual scale, volume control, BFO pitch control and a socket for a hearing-aid type earphone. On/off switching is done by removal of the 4 pin power plug on the side.



The 'radio' box, Battery box and dial calibration chart.



The 'radio' box, bottom view, cover removed

The moral of this story is that, contrary to common belief, amateur radio and related aspects of our hobby are not being killed by the Internet. Rather, it can provide a useful adjunct by giving access to almost unlimited sources of information.

The externals

The set comprises two grey steel boxes, each about 170 x 90 x 35 mm and weighing just over 1 kg. One is the main receiver whilst the other houses the 'A' and 'B' batteries, plus it also has the dial calibration scales its upper side. The receiver is a five valve superhet covering from 500 kHz through to 18.4 MHz in four bands and band changing is achieved by plugging in the coil box (the small rectangular box at one corner) in one of four positions, which is quite a clever way of avoiding a cumbersome wave-change switch. As may be seen from the photographs the front panel controls include the main tuning knob which has a dual scale, volume control, BFO pitch control and a socket for a 1950's UK hearing-aid type earphone. On/off switching is done by removal of the 4 pin power plug on the side.

The internals

Photo 2 shows the inside of the receiver and the most remarkable feature is the two-gang tuning capacitor which is arranged in a side-by-side configuration to keep it shallow; I have never seen this type of tuning gang anywhere else! Apart from the DK91/1R5 pentagrid mixer all the valves are Mullard sub-miniature types with B8D bases. These valves draw only 25 mA of filament current each. The IF transformers look like Philips types whilst the rest of the components are obviously of British manufacture. Everything is held together with 6 or 8BA screws; more evidence for its British origin.

The battery box was designed to hold a 1½V D-cell for the filament supply and a rectangular 67V battery for the HT supply; these could be replaced with a mains power adapter. Because 67 V batteries are no longer readily available I made up a substitute from five 9V #915 batteries in series so as to be able to test the set. Making a 2 pin plug for the earphone socket was more of a challenge. However, to my great delight when I connected an antenna and fired it up stations came through loud and clear and I found I could hear them quite well on a small 45 ohm speaker salvaged from a junked transistor radio.

Thanks John for a very interesting description.

Roy Symon ZL2KH
Secretary / Treasurer,
SPAM (NZ)

Old Timers' Club

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Net details: 2030 hr (local time) each Monday on 3.870 MHz LSB.

My file of copy for this page was empty but, once again, most welcome copy has arrived; this time from George ZL2AG. Thanks George, your reminiscing will bring happy memories to many of our members.

New Members:

There is one new member to welcome this month:

- 1286, ZL3MEM, Maurice McNab, Kaiapoi

Silent Keys:

There are two members to farewell. They are:

- 1154, ZL2JC, John Cleland, Palmerston North
- 848, ZL1BDO, Eric Mancer, Orewa

Our sympathy goes to their families and friends.

Certificates sent out:

Long service certificates have been sent to the following:

75 Year Certificates:

- 1083, ZL2LX, Reg Motion, Tauranga

60 Year Certificates:

- 1059, ZL3KR, Alan Hughes, Christchurch
- 534, ZL1ADI, Charles Rademacher, Helensville

50 Year Certificates:

- 1283, ZL4TAE, Terry Thomas, Dunedin

Congratulations to these four members.

Annual General Meeting:

The Annual General Meeting of the Old Timers' Club (ZL) will be held on the Sunday morning of Queen's Birthday weekend (3rd June 2012) at the NZART Conference in Nelson. The business to be conducted will include the election of officers and other usual AGM matters. The recipient of the Montgomery Cup for the best article in *Break-In* by an OTC member in the preceding year will also be decided. If you are unable to attend and would like to nominate anyone please send your nomination to me. Nominations will need to be seconded, and the permission of the person being nominated will also be necessary.

There will also be time for the discussing of all sorts of matters that you might like to initiate. I will not be attending the conference in Nelson. My grateful thanks to Stuart ZL2TW who has agreed to chair the OTC AGM. Also I will not be available for re-election as secretary / treasurer and *Break-In* contributor so a volunteer will be needed for these positions to ensure that the OTC can continue to function.

The Nostalgia of Radio; A purely personal view by ZL2AG: Part 1:

Having written that title I wondered why I had. Apart from the fact that nostalgia is very difficult to define it can never be anything other than personal. The word actually comes from the Greek (*Nostos*: return home, *Algos*: pain) and means homesickness but sentimental yearning is perhaps a better description. I think there must be a sort of insanity in it as well. What is wrong when one can feel nostalgia for things one is not old enough to remember? The Second World War is very real for me but I had yet to start school when it ended.

In an essay entitled "The Meaning of Nostalgia" (*TIME* magazine, 3 May 1971) Gerald Clarke says, in part, "Illogical though it may be, some people in their 20's and 30's do feel a longing for a time they never knew. Indeed, there seem to be two kinds of nostalgia, one for youth and one for middle age and beyond." Well, at least I'm not alone. Mind you, I'm not 20 or 30 any more either but it still doesn't make the condition any easier to understand.

My earliest memory of radio is of a Columbus model 12. This small bookend-shaped set cost my parents £5 in 1941 and was paid off at seven shillings and sixpence a week. Not that I knew what it was at the time of course. There is never any great accuracy in very early memories. They tend to be a curious mixture of personal experience, what one has been told and the experiences of those with whom one has lived. My memory of our "Wireless" goes back to such a time and I can recall always being intrigued by it. It made noises. People spoke out of it. It lit up. It got warm and had its own peculiar odour. In time the varnish peeled off the top in a vaguely oval patch. From what I could see of it, peering in the back as a small child, there was nothing there to explain any of the things that it did. I imagined the voices coming from a disembodied head (side on) behind the speaker cloth but the music was so far beyond my comprehension that I simply didn't think about it.

There is no accounting for what will stick in one's memory. For the rest of my time I will associate the Columbus model 12 with the Raytheon 6K8G and vice versa. This particular component, with its black internal screen and orange base markings was, to me, the most obvious and mysterious part of the set. I still have that Columbus model 12 and have collected a few Raytheon 6K8s too.

My interest in radio, which my father always referred to as "wireless", (he had been a 'spark' operator with the original Marconi Company) continued through my childhood and adolescent years. At primary school the common interest formed a group and we experimented within the bounds of our meagre knowledge and very limited parts availability. Much use was made of telephone earpieces and electrical parts were obtained from any available source. With little pocket money it was all very difficult. I can recall using a 3-heat stove switch to change the tuning arrangement on a crystal set coil. My first crystal set was a complete failure due to the use of a metal can as a coil former. A baking powder tin (well; it was the right size and shape) was covered with insulation tape and an old telephone induction coil was unwound to provide the wire. The detector was purchased from Lamphouse® with money cajoled from my parents and a telephone receiver (low impedance) was the headphone. Nothing worked! Yes, I was on a very steep learning curve. As for valves, well, where were we to get them? A 1Q5GT retailed at about 15/- at a time when I was on 1/6d a week pocket money. Anyone in our little group who had a valve of any type was well up the pecking order and even then a valve needed components around it. Visits to Lamphouse, 11 Manners Street, Wellington, were occasions of wide eyed wonder and much frustration. The prices!

Insulation tape, as we knew it then, was that black bituminised linen stuff that wouldn't stick to anything if it was dusty or wet. Its correct name was Manson's Tape and to call it insulation tape was more an affirmation of faith than a statement of fact. You could see light through the stuff! Still, it did have its uses. I've known people use it as an antiseptic wound dressing and it probably served that purpose well.

As time went by both my knowledge and parts availability increased. At college I obtained, courtesy of another enthusiast, my first valve. It was an RCA 221 and I still have it; a treasured part of what has become a very large collection. By this stage I had progressed to a somewhat better financial situation and the Lamphouse Bargain Basement, lower Cuba Street, Wellington, was in its heyday. This place, filled with vast amounts of War Assets stock, became almost a second home but most of the prices were still beyond me. By this time my parents had recognised an obsession and I had my first Hiker's One kitset. They were never flush with money and anything costing as much as 55/- (headphones extra) was reserved for Christmas or a birthday. The building and operating of this set was a significant event in my hobby career and from then on more general success was achieved. The college group was in ascendancy too and old chassis obtained from rubbish dumps were rendered down and the parts jealously hoarded. I obtained an electric soldering iron (birthday present) and experimented with many valves (including a 6L6) in the Hiker's One circuit. I came to know the expensive "Tink!" sound that the

Magazine Survey

Compiled by Grahame Fraser ZL3SJ
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Amateur Radio (WIA)
January/February 2012

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p18 The 'Dibble' digital mode interface box, with an introduction to PSK31
p22 Ten tips for ten watts – by someone who does it with two
p46 Six-monthly review of operational OSCARs

March 2012

p10 The evolution of a communications trailer (or mobile shack)
p22 Our noisy world (reducing noise by using a dipole instead of a vertical, and suppressing local AM broadcast signals)
p26 Salvaging parts: what to take and how to use it
p36 Tunnels in the sky ? (a propagation oddity?)
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CQ
January 2012

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p35 Who Needs a Microphone For a Phone Contest (use audio stored as computer files)
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p65 Safety in the Ham Shack
p74 Receiver SWR and Some Simple Antennas for 10 Meters

February 2012

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p83 Data Error Detection &Correction

QST
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p30 Avoiding Problems in the RF Chain (maintenance on connections between rig and antenna)
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p37 Going Totally Green (permanent independence from a.c. mains)
p40 Double Your Mobile Antenna Use (use it as a fixed vertical)
p47 Link Coupled Tuners for HF (for balanced antennas with open-wire lines)
p51 Type-N Plugs for the Dedicated UHF Plug User
p63 Hands-On Radio #109 PCB Layout – Part 3
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p80 Project OSCAR: A celebration of 50 years of amateur satellites

Radcom
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p77 Start Here: Getting started in Morse code

March 2012

p14 A novel NVIS antenna for 5MHz
p18 Homebrew: Rebuilding the 400W HF PA plus a simple beam for 10m (Moxon)
p23 Antennas: Compact beam antennas without loading or traps
p27 Design Notes: Direct down-conversion chips (using U2794,AD8347 or AD 8348)
p32 Chirp Modulation: Real time propagation indication (radar) and a new beacon mode (back-scatter from individual ground scatter points)
p38 Restoring trapped tri-bander Yagis for HF
p63 Start Here: Station maintenance
p72 A low cost timing system for ARDF (using Dallas iButton from Maxim)

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filament suspension hooks of a battery valve make when they hit the inside of the top of the envelope after the application of the HT battery to the filament line. Much experience was gained at this time but my greatest ambitions were always stifled by a lack of cash.

Filament supplies at that time were invariably No.6 cells; the large 1.5 volt jobs that cost about 3/10d. Quite useful things they were. A fresh one could supply a short circuit current in excess of 20 amps so you had to be careful with them. Keen types used to recover the Fahnstock clips off old ones. Really keen types used to stand flat ones in "Agee" preserving jars full of salt water to keep them going until they collapsed completely. They were used in vast numbers in the telephone industry but are now seldom seen. Like the long necked beer bottle they have become a curio of no intrinsic value. Not so very long ago a long time Wellington retailer was still stocking them at $28-00. Date coded 1987 and made in India no less.

At this time the Hiker's One was the centre of my interest. The circuit was reliable and always allowed restoration if some modification or addition failed to work. I recall lying in bed at night listening to 2YD, which, being located straight across the harbour from home, swamped most of the dial. The station played "Fascination" as a closing down tune at 10pm after which a bit of tuning around could be done. In pitch darkness the only light in the room was the interior of the valve anode, illuminated by the orange glow of the filament strands. If I had dozed off and reawakened (not infrequent) my night vision could detect a faint patch of orange light on the ceiling above the set. To this day, when I look into the top of a battery valve and see the filament lighting up the anode interior, all this comes flooding back. Such is nostalgia.

But, there were worlds to conquer beyond the Hiker's One. I bought books. *Lamphouse Annuals* and a *Lamphouse Data Book* which I still have. "*Popular Mechanics*" was read avidly in the school library although I cannot remember building anything from it. My Christmas present for 1958 was a Philips valve data manual. It came from Whitcombe and Tombs for 18/6d, which was substantial in those days. I still have that too and it has been well used. Some *Lamphouse Annuals* contain a 'Radio Doctor' section which details common faults and their causes. Here, I thought, was the answer to a lot of my problems. If I built something that didn't work all I had to do was work my way down the 'Set Inoperative' column and all would be well. But no; they were too smart for that. One of the causes given was "Set incorrectly wired".

The manuals and magazines showed circuits with intriguing and unlikely names. Who would ever dream up something like the "Super Bandsucker Six" or the "Spacelicker Two", the "Globegirdler Seven" or the "Skysweeper"? Names to stir the blood of any schoolboy and all advertised for their ability to pull in the stations. To be perfectly honest I never encountered a "Bandsucker Six" but the others are all familiar from somewhere. Also, I have yet to meet a set that actually "pulls in" stations but I suppose it is all in how you interpret the terminology.

(To be continued next issue)

Roy Symon ZL2KH
OTC Scribe

WARO – nz womens amateur radio operators

with Topsy ZL2LS, Sharon ZL2BQ and Ngaire ZL2UJT
<waro@nzart.org.nz>

As I am writing this the sun is out and we have actually got a real summer's day at last. Not sure how everyone else has fared but we certainly haven't had a summer here in Taranaki, and I know the Nelson girls would agree they have had more than enough rain in their usually sunny area. Radio wise 80 m has been up and down and some nights it's so difficult to copy people on the WARO net I have had to make a guess at what they are saying ,which makes it not that enjoyable to listen to. As the sun goes down it tends to improve, but still difficult.

By the time you read this we will have held our 50th WARO Anniversary in Rotorua and I hope that everyone had a great time meeting up with friends and making new ones, it's always great to put a face to a voice. It's a pity that the South Island and North Island girls couldn't have all been together but hope you girls from the South had a wonderful time also.

Here in New Plymouth we have been trying to encourage some of the girls who were keen Radio operators in the past come back to the fold. It's like a lot of hobbies, other interests take priority and also people are not able to maintain their radios. It's great that people like Bev ZL1OV and Celia ZL1ALK have continued on with their hobby after losing their OMs and enjoying the comradeship of other like-minded girls.

Please don't forget to register for our wonderful NZART Conference this year 1, 2 and 3 June in Nelson. WARO AGM will be on the Sunday 3rd 8.30am so would love to have as many WARO members there as possible. Registrations close 20 May so be in and come and enjoy the hospitality in Nelson.

Thelma Souper Memorial Contest 2012

Please don't forget this will *NOT* be held this year. This is because of lack of support for the past two years, so we have decided to take a year's break. Maybe next year people will participate more.

Ladies Get Together in Taranaki

This was held on the Sunday 12 February at a local garden café in New Plymouth. We were so lucky to have a fine day, and a great turnout of 17 people, which included husbands. Special guest was George, Le-ann O'Donnell Zl2TLO's little boy who has been attending our get together since he was just a few weeks old, hopefully the radio bug will rub off on him as his Mum, Grandma and Granddad are all Hams. It was wonderful to have Ann Griffiths ZL2BOV and Anne Francis ZL2UTR come as both these girls were very active in the past, but both have not been on air for some time. Anne ZL2UTR needs an aerial erected at her lovely new home and my OM Graeme suggested it might be a good project for our club to go and give her a hand to erect it and then she will be back on air. Ann ZL2BOV is working long hours in her job and hopefully soon will slow down her work commitments and also join us. Carolyn ZL2JP also came with her OM Dennis ZL2ME, and we hope to have her back on air sometime in the future. It was really great to chat about old times and the various Field Days we all attended over the years. Everyone agreed to do this again next year. Even the OMs enjoyed their time together and caught up on problems with their Aerials and general radio chat. Great to see some of the girls still keen on DX and comparing notes on who had spoken to the most isolated spot. It was sad Cathy ZL2ADK and Brian ZL2ADL couldn't make it here as they have been involved with Taranaki group for many years, but unfortunately had other commitments. After people had finished talking and eating many of us moved over to the garden centre where they did quite a good little trade in plants from us keen gardeners. Everyone is now talking about where we are going to hold the next one and suggestions were made of other cafés in the area.

Field Day

Hope many of you ladies had a go at Field Day activities on 25 and 26 February. It's really worthwhile doing this as it helps our radio skills in case of an emergency situation, and also it's good fun and a great time to mix and mingle with your club member in a social atmosphere. We had a great turn out of members this year, some participated in the contest, and others helped erect the aerials and tents. This is what Amateur radio is all about and it was great to have some of the family members showing an interest in radio also.

Please remember to support your *Bulletin*, WARO page in *Break-In* and our competitions. See you at NZART Conference

Cheers, take care and enjoy this great hobby of Radio.

Ngaire ZL2UJT,
Topsy ZL2LS,
Sharon ZL2BQ

Some of our "Taranaki Ladies get together group" (l>r) Barrie Zl2LA, Lynne YL, Ingred ZL2ICE, Aleister ZL2BZN, Jill Zl2DBO, Le-ann ZL2TLO, (rh side) Wayne ZL2VN, Carol ZL2VQ, Myrle ZL2MIC, Ngaire ZL2UJT, Marie ZL2WMM, Ann ZL2BOV (missing from photo Ann ZL2UTR and Carolyn ZL2JP).

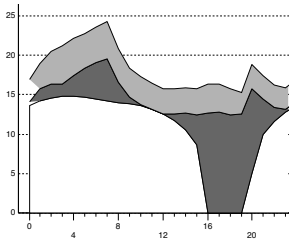
Carolyn ZL2JP on Field Day.

Ngaire ZL2UJT on Field Day.

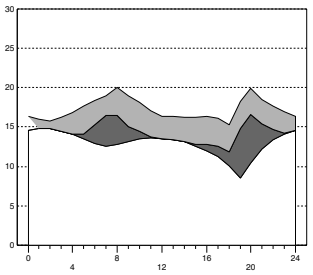
Branch 27 Field Day; some of our group enjoying the evening sun

Ionospheric Predictions

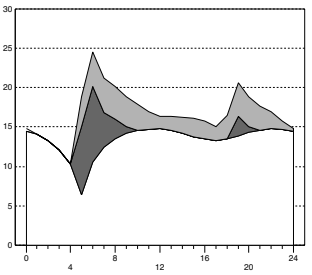
MAY / JUNE 2012 **T-index = 80**



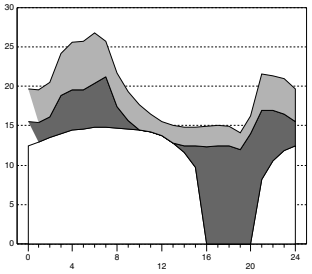
WN-
Moscow
(SP)
16548 km
312°



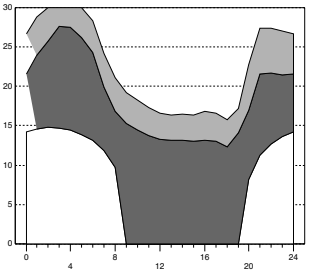
WN-
London
(SP)
18814 km
343°



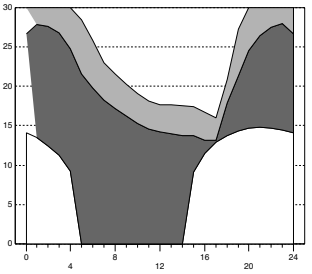
WN-
Jo'burg
(LP)
28265 km
31°



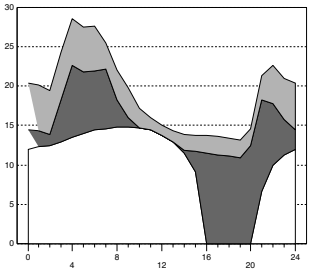
WN-
Istanbul
(SP)
17168 km
281°



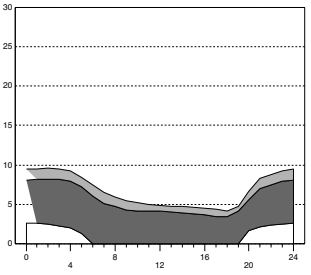
WN-
Tokyo
9274 km
332°



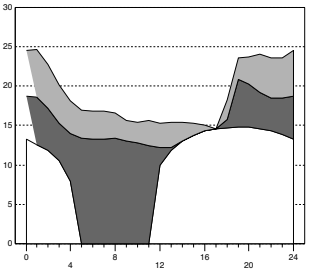
WN-
San
Francisco
10859 km
45°



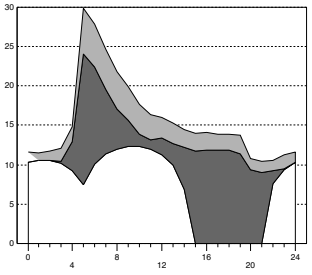
WN-
Cairo
16519 km
261°



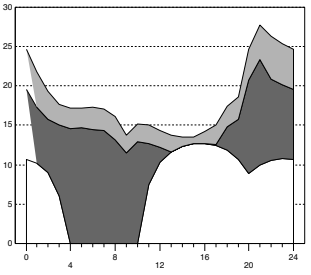
WN-
New
Zealand
300 km



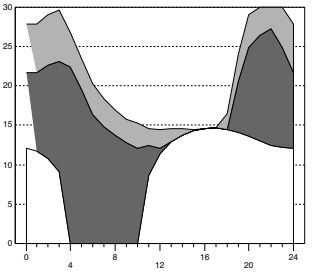
WN-
New
York
14402 km
66°



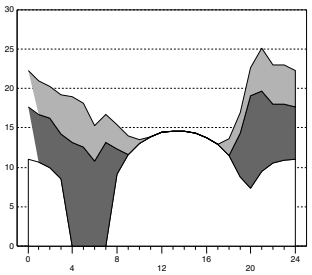
WN-
Jo'burg
(SP)
11759 km
211°



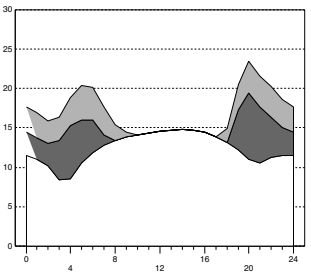
WN-
Rio de
Janeiro
11780 km
144°



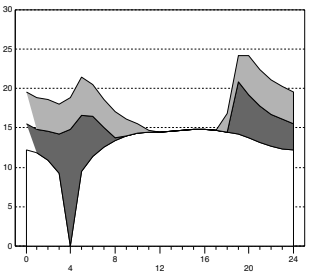
WN-
Barbados
13962 km
104°



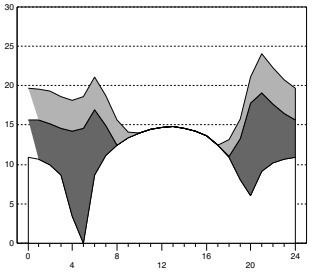
WN-
Dakar
16862 km
155°



WN-
Moscow
(LP)
23476 km
132°



WN-
Istanbul
(LP)
22856 km
101°



WN-
London
(LP)
21210 km
163°

Horizontal axis shows time in UTC.

Vertical axis shows frequency.

Propagation is possible in the shaded areas, with best operation in the darker area.

These predictions are based on solar activity data supplied by IPS Radio and Space Services.

See pages 6–9, Break-In May/June 2004 "Choosing the Best Frequency" by the late John Gabites ZL2AQ for interpretation of forecasts and explanation of terms MUF, OWF and ALF.

HAMADS

WANTED: RADIO VALVES. Cash paid for old radio and TV valves. Prefer new in boxes. Telephone (09) 575-6940 or E-mail <paul.ssegrub01@gmail.com>.

WANTED: FT101E – Working or suitable for parts. Also, any Yaesu station equipment. ZL3TFM. E-mail <bksmith@snap.net.nz>.

WANTED: Com IC745 meter only or complete rig in any condition. Payment dependent on condition. S. Vincent ZL4OW. Telephone (03) 434-5428 or E-mail <stanvincent@xtra.co.nz> or *Call-Book* Address.

WANTED: FT-790RII All Mode 70cm transceiver going or not with the 25W linear amplifier (FL-7025) or just the amplifier. Kevin ZL3DAC. Telephone (03) 789-9875.

WANTED: Thermocouple TC102 (Acorn Type VHF). Used in Marconi Signal Generators Type TF 144H Series (10kHz to 72MHz). Peter Le Quesne ZL4TCC. Telephone (06) 843-8212 or E-mail paleq@clear.net.nz

FOR SALE: Atlas 215X, console version (includes PSU and speaker in cabinet). Osker SWR200 bridge, Electrophone MC521A mike, brass morse key and oscillator. Offers to George Thomson ZL3DZ. Telephone (03) 354-9405 or E-mail <georgethomson@xtra.co.nz>.

FOR SALE: Antenna Rotator, Yaesu G-600RC Rotator. Contact Ron ZL1TI. Telephone (03) 358-9481 or E-mail <godkinlr@ihug.co.nz>

Hamads and Classified Advertising in *Break-In*

Hamads up to 30 words are now free as a service to members but the following conditions will apply:

(1) Hamads. A single, free Hamad in each issue of *Break-In* is only available to financial members and Branches of NZART buying or selling personal equipment. Members and Branches wishing to use this service must include their NZART Membership Number or other evidence of membership. If possible they should use the official HAMAD form (on the reverse of their address sheet). If this is not convenient the advert may be emailed or sent typed double-spaced, but proof of current membership must be provided.

Each free Hamad is limited to 30 words; any extra words will be charged at the current rate of 25c per word, telephone and fax numbers count as two words each, e-mail addresses and *Call Book* address as three words each. All prices include GST. Free Hamads will also be accepted for sales of deceased estates where the member was a financial member of NZART during the past 12 months and from branches who are financial members of NZART (ie have a Membership No).

Advertisements are accepted in good faith from amateurs and may only be used be the sale of used radio and allied equipment. The Association, or its representatives, can take no responsibility for them nor take part in any discussion resulting from sales or purchases; remember "Caveat emptor". In case of dispute, the Editor's decision is final.

Trade or business adverts, even from members, will not be accepted here, since this is a subsidised service to members.

(2) Classified Advertisements are available to members, non-members and commercial firms offering products or services for sale, etc. All adverts not meeting the Hamad criteria will be considered to be Classified Advertisements.

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(3) Display style adverts will be still be charged for at the current rates.

(4) Closing date. Please send Hamads and Classified Advertisements to The Advertising Manager, PO Box 1733, Christchurch, to be received no later than the 10th of the month prior to publication. Please make cheques payable to NZART; no cash or credit cards. The Editor and NZART Inc reserve the right to discontinue or decline any advertisement.

For further information and commercial advertising rates, please contact:
Lorne Douglas ZL2AHB, Advertising Manager, c/- PO Box 1733, Christchurch. Telephone (03) 358-9100. E-mail: <hamads@nzart.org.nz>.

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- RF Speech Compressor Increases Average Talk Power
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